FLIGHT

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

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EDITORIAL COMMENT.

Mr. Churchill and British Aerial Supremacy.

The speech of the First Lord of the Admiralty at the Guildhall Banquet on Monday night was a notable one from several points of view. So far as we are concerned, its principal interest centred about his pronouncements regarding the future of our plans for aerial defence. With regard to this branch of the Service, he was given a distinct invitation to define the intentions of the Government by Col. Humphery, who proposed the toast of "The Imperial Forces." Speaking of the Royal Flying Corps, the gallant colonel said that they must remember that the officers and men of that branch were daily taking the same risks in peace time as they would be called upon to take in time of war. They were filled with admiration for them, and anything the Admiralty and War Office could do to improve the conditions of service would be approved by the citizens as a whole.

In his reply, Mr. Churchill, after traversing matters connected with the various branches of the Naval service, came to the specific point of aerial defence, and expressed himself thus:—

"Even in the regions of the air into which with characteristic British prudence we have moved with some tardiness, the Navy need not fear comparison with the Navy of any other country. The British seaplane, although still in an empirical stage, like everything else in this sphere of warlike operation, has reached a point of progress in advance of anything done elsewhere. Mr. Alderman Humphery, in his extremely comprehensive and well-conceived speech, has referred to the air service, and I agree with him that our hearts should go out to-night to those brilliant officers, Commander Samson and his band of brilliant pioneers, to whose endeavours and to whose devotion it is due that in an unprecedentedly short space of time our Naval Aeroplane Service has been raised to that primacy from which it must never be cast down. But that is not enough and I have come here to-night to tell you that it is not only in naval aeroplanes that we must have superiority. I would venture to submit to this great company that the enduring safety of this country will not be maintained by force of arms unless over the whole field of aerial development we are able to make ourselves the first nation.

That will be a task of long duration, and many difficulties have to be overcome. Other countries have started sooner. The native genius of France, the indomitable perseverance of Germany, have produced results which we at present cannot equal. In order to achieve the position which is necessary, the War Office and the Admiralty will have to work together, as they are now working, in the closest intimacy and co-operation. In order to achieve that position you will have to make up your minds to spend year after year your money, and month after month to pay toll of precious life. The keenest—aye, the surest hand, the most undaunted heart must be offered and risked and sacrificed in order that we may attain, as we shall undoubtedly attain, that command and perfection in aerial warfare which will be an indispensable element, not only in naval strength, but in national security."

Sir John French, who responded for the Army, made but a brief reference to aviation, simply contenting himself with a tribute to the work done by the Royal Flying Corps during the manœuvres. He said nothing as to any possible future expansion of the military wing, so we are left to assume that the official view is that that section of the R.F.C. is sufficient for our needs, if and when the establishment laid down for it has been completed. We do not intend to quarrel with that view, if it be, indeed, the one which is held in high quarters, since it does not matter in the least to which branch of the service the

aerial establishment is attached, provided it be adequate for the fullest requirements of the country in war time. That question is purely one of organisation, and as such does not concern us as laymen.

Mr. Churchill, as will be seen from the text of his speech which is quoted above, was far more definite in his pronouncements than Sir John French. That part of his speech which dealt with aviation must be regarded as by far the most important statement which has fallen from the lips of any responsible Minister of the Crown with regard to this most pressing and important question of aerial defence. Speaking with all the weight of his authority as the head of the Royal Navy, Mr. Churchill tells the country most definitely that we must be supreme in the air, as we are on the seas. That is good hearing to the country at large, since it disposes of a question which all thinking men have been asking themselves since the day it was first realised that aviation as a serious factor in war had really arrived. For too long have Ministers kept the country in the dark regarding official intentions. Not that we should have had so much of which to complain if the actual intentions of the Government as to detail had been withheld from motives of policy, if only something had been said to convince the country that the vast importance of aviation was fully and thoroughly realised by the heads of the fighting services. Our complaint has always been that there apparently existed a state of almost apathy regarding the enormous strides which were being made by our possible enemies of the future. While they were building, we were not even talking or at most in a very general sort of way. There was nothing to show that the Government had a real policy of any kind, and hence there has possibly arisen some amount of misconception of the true official attitude.

However, if we are to take the First Lord as seriously as his words would indicate—and we can do nothing else—the time of apathetic standing by, watching the strength of our rivals growing by leaps and bounds while our own fell more and more behind in comparison, has gone for ever.

Mr. Churchill tells us that the Government has but a single aim—to make Great Britain absolutely supreme in the air. He has not taken the country into his confidence regarding the margin which he and his advisers consider will constitute that unchallengeable supremacy of which he spoke. That, after all, is a matter of policy which may well be kept from the common knowledge for the time being, and we should be last to cavil at the reasons dictating secrecy. All we are concerned with at the moment is that we have got the pronouncement for which we have been waiting for so long, and are correspondingly thankful for it.

It is true that we still have to wait for the consummation of the promises held out by the First Lord, but we have confidence enough in Mr. Churchill's administration of the Admiralty to believe that his pronouncement was not of the order of those fine words which, we are told, butter no parsnips. Nevertheless, we shall anxiously await the publication of the Supplementary Estimates for the Navy, which will be brought before the House of Commons immediately on its reassembling in February, so that we may see how Mr. Churchill proposes to translate his words into deeds.

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LOUIS NOEL.

PILOT.

Two years of study at the Polytechnique sufficed to impress upon Louis Noel that book-learning was not his *forte*, and, leaving school, he turned his attention to motoring. From his youth up, however, Noel had a hankering after aeronautical matters, He was one of the fortunate few to witness the first *experience* of Blériot, and that sealed his doom ; from that time he could not get away from the ambition of being a flyer himself. About seven years ago he came to these shores ostensibly to learn English and practical engineering, but the moment an opportunity came along he was at Brooklands learning to fly. He received his first lesson at the hands of Maurice Ducrocq, and subsequently joined the Avro School. There he used to fly the old Farman 'bus in all sorts of weather, and the way in which he handled the machine in high winds showed that he was a born pilot.

In June of last year he joined the Grahame-White school as a pilot and instructor, and in the following August he, with Mr. Gates, had the distinction of being reported as "missing," while flying from Paris to London. Eventually they reached Boulogne, and from there Noel flew across the Channel to Eastchurch. Subsequently he flew the famous "Wake up England" Farman from Folkestone to Margate and Southend, and also gave exhibitions at other watering-places on the South Coast. Last winter he went with Mr. Claude Grahame-White to St. Moritz, and piloted the same machine over the Alpine snows. His work at Hendon as an instructor and passenger carrier, and in competitions on the Henry Farman and Maurice Farman types of machine, is too well known to readers of FLIGHT to need any repetition here, as also are his recent world's records in passenger carrying, on the Grahame-White five-seater char-a-bancs.

"THE HAWK."

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THE ROYAL FLYING CORPS.

The following was announced by the Admiralty on the 5th inst. :—

Capt. the Right Hon. the Lord Dunboyne (retired) to the "Hermes," additional, for meteorological duties, to date Nov. 3rd.

The following was announced by the Admiralty on the 6th inst. :—

Sidney V. Sippe has been appointed Probationary Sub.-Lieut. in the Royal Naval Reserve, with seniority of November 5th, and appointed to "Hermes," additional temporarily.

The following was announced in the *London Gazette* of the 7th inst.:

R.F.C.—Military Wing.—*Special Reserve of Officers.*—John Claude Joubert de la Ferté to be Second Lieut. (on probation). Dated November 8th, 1913.

ROYAL FLYING CORPS (MILITARY WING).

WAR OFFICE summary of work for week ending November 8th :—

No. 1 Squadron.—The "Beta" and "Delta" were out most days in the week for instructional purposes. Several free balloon runs were made, these form initial part of an airship pilot's training.

No. 2 Squadron.—The week was chiefly devoted to training the recently joined officers in flying fast machines and in observation work.

No. 3 Squadron.—A, B and C flights were all busy during the week. This squadron held their annual revolver shooting competition on the 5th, 6th and 7th.

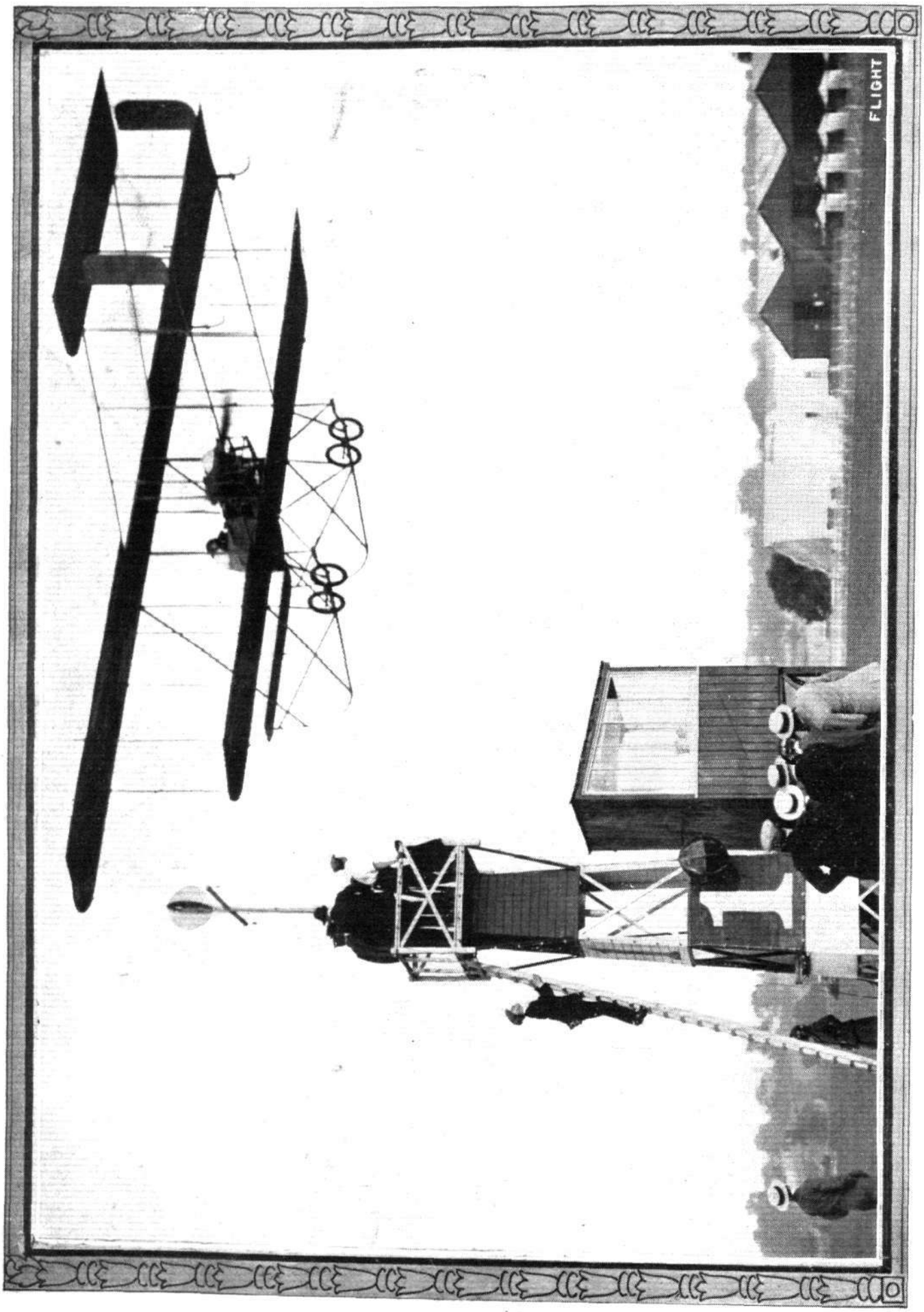
No. 4 Squadron.—The machines of "A" and "C" flights were out daily carrying out instructional and reconnaissance flights.

No. 5 Squadron.—"C" flight was busy daily throughout the week. The nucleus of "A" flight is at Dover. Lieut. Anderson flew with a following wind to Dover from Farnborough on the 3rd, at the rate of 85 miles an hour on a M. Farman. The recently joined officers are obtaining a considerable amount of practice.

Flying Depôt.—Experiments along various lines were continued.

MEN OF MOMENT IN THE WORLD OF FLIGHT.

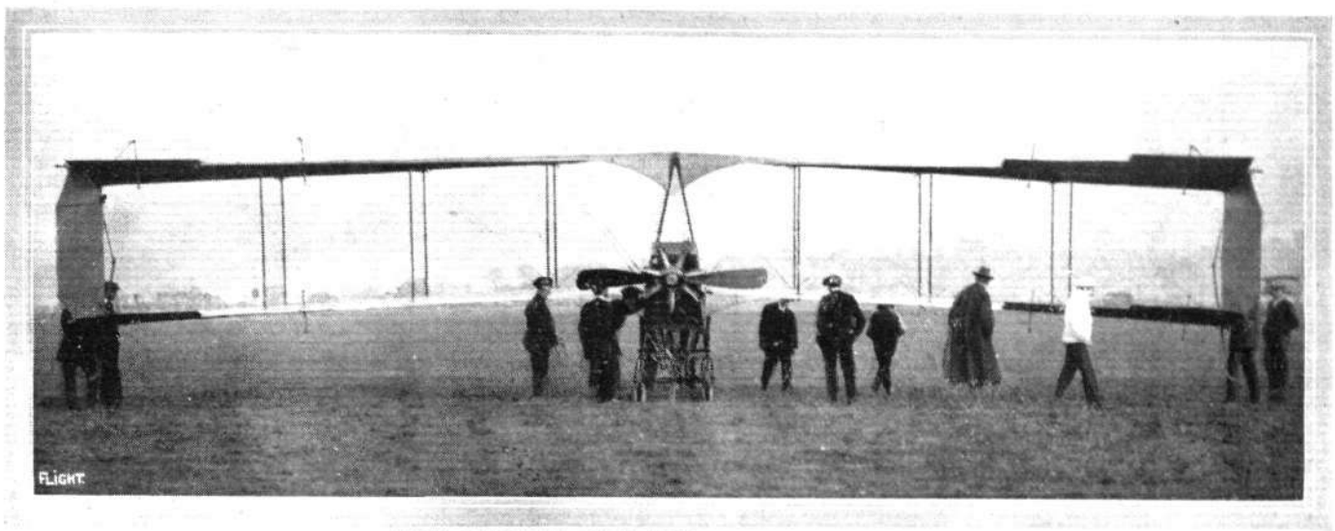
MR. LOUIS NOEL.



AN EXHIBITION OF VERRIER'S EXPERT STEERING.—Seeing how close he can fly his Maurice Farman to No. 1 pylon at Hendon Aerodrome. Upon one occasion recently his extension support actually touched and moved the disc race indicator at the top. Note the *habitués* watching the performance.

FLIGHT

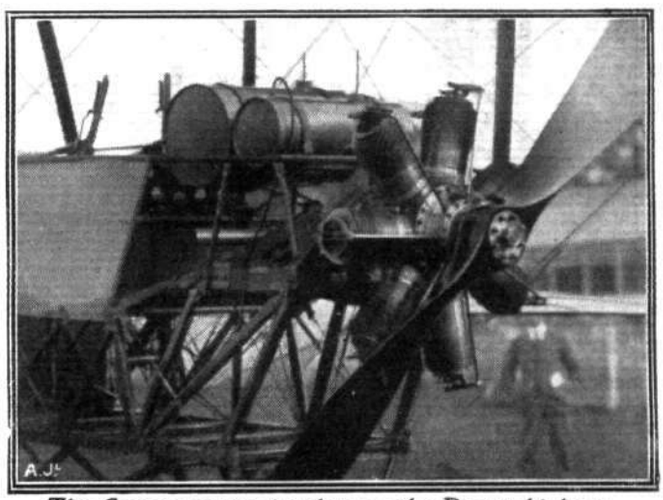
THE DUNNE BIPLANE.



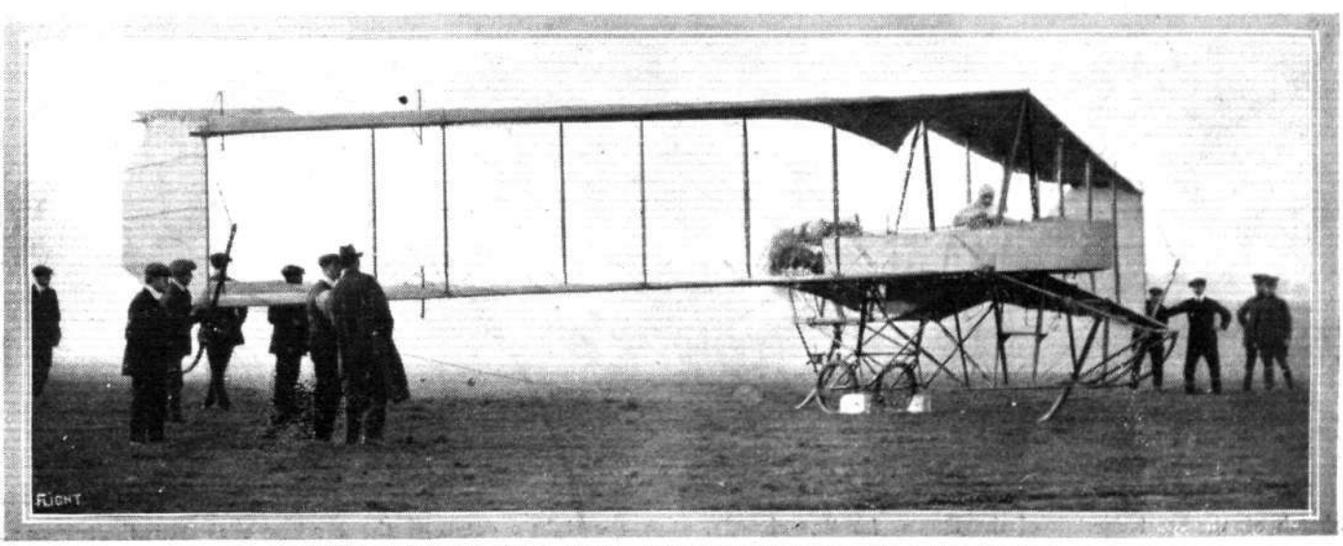
THE DUNNE BIPLANE.—View from the rear.

AT the present time there may be said to be two general types of aeroplanes which have been designed with a view to obtaining inherent automatic stability. One type has been developed in Austria and Germany by Herr Etrich and in this country by Mr. Handley Page, and the other is the Dunne type here described. As the theory of the Dunne machines has already been fully explained in the columns of FLIGHT (June 18th and 25th, 1910), we need not here enlarge upon that subject, but can confine ourselves to a description of the practical construction of the machine. We should like, however, to point out the most essential difference between the Etrich-Handley Page type and the Dunne. In the former stability is obtained by having the *trailing edge* of the back swept wing tips raised, thus setting these at a negative angle of incidence, whilst in the Dunne the *leading edge* of the wings are given a negative dihedral angle in order to obtain a negative angle of incidence on the wing tips. Another point in which the Dunne differs very considerably from the other types is that whilst these have tail planes of the ordinary type the Dunne machines have no tail planes, or, more correctly speaking, the back swept main planes perform the duty of the usual tail planes, in so far as they serve as both rudder and elevator.

From the plan view of the machine it will be seen that the main planes slope backwards very considerably, 14 ft. to be exact. Whilst the chord remains the same throughout the whole length of the planes, the rear spars slope

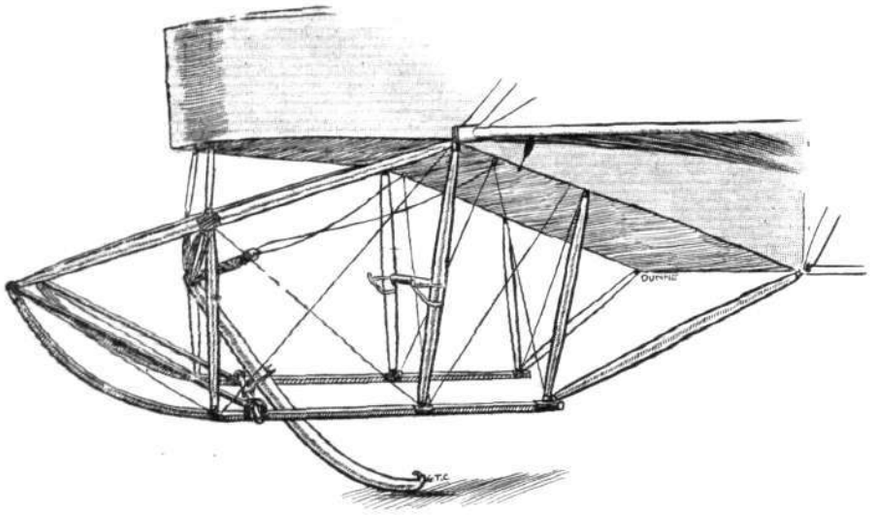


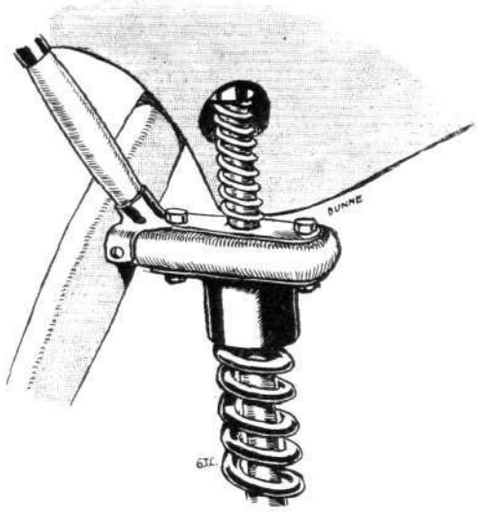
The Gnome engine in place on the Dunne biplane.



THE DUNNE BIPLANE.—Three-quarter view from the front.

less back than do the front ones, so that the amount of overhang of the trailing edge is considerably more at the tips than at the root of the wings. This, of course, has the advantage of allowing larger *ailerons* to be fitted, as these are hinged to the rear spars. The main spars, the front one of which serves at the same time as leading





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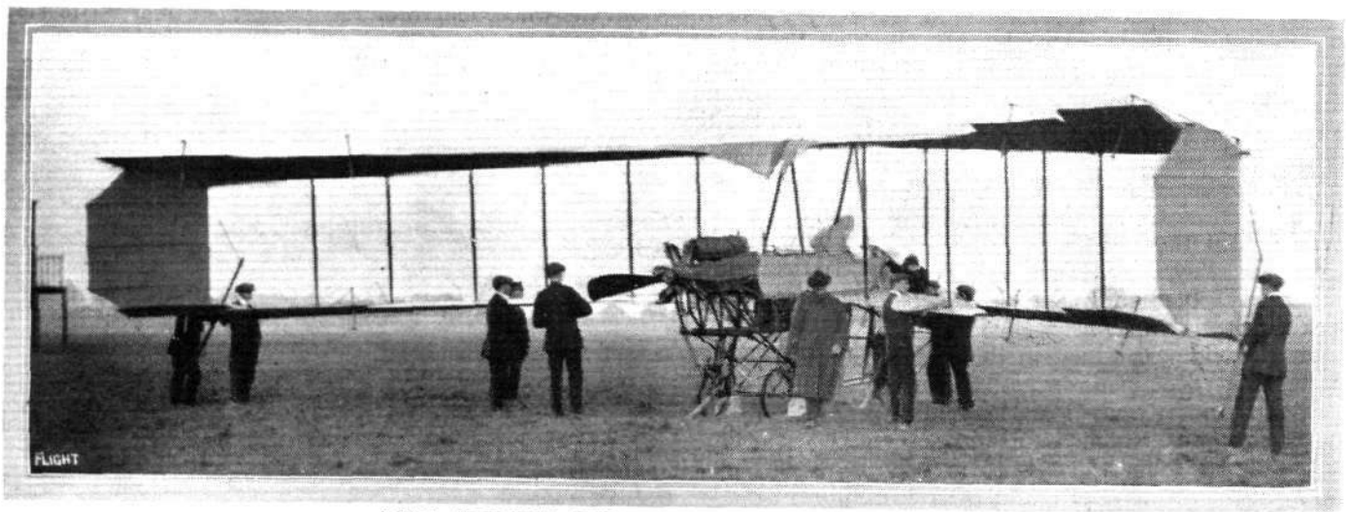
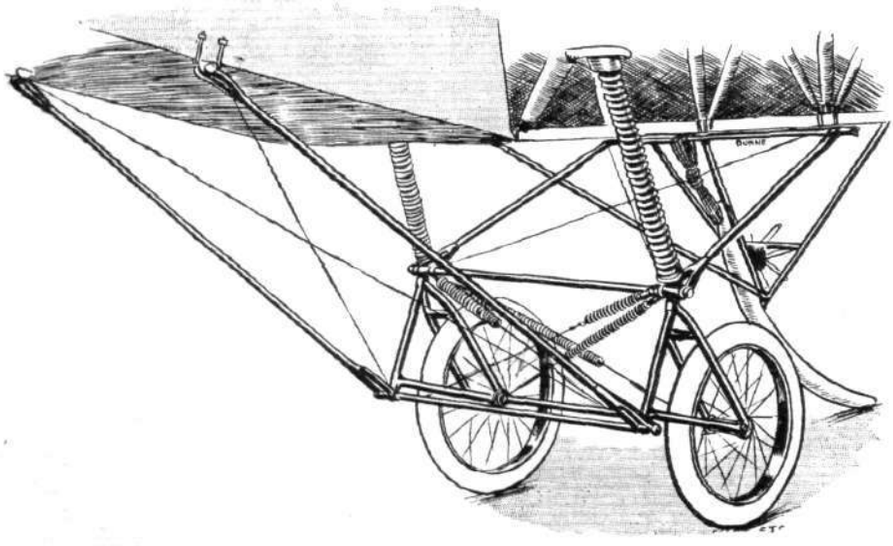
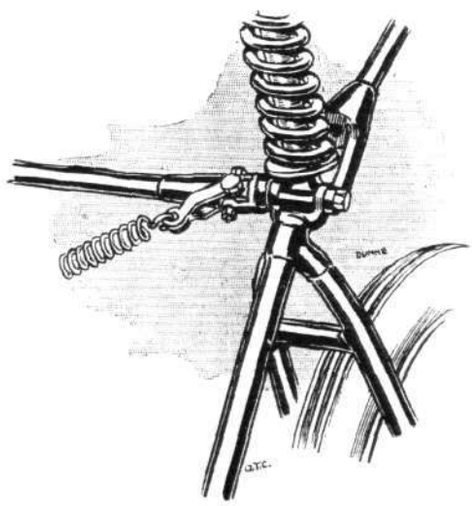
The front (wood) portion of the chassis, and on right the upper part of the shock-absorbing spring, together with the smaller spring designed to prevent excessive recoil on landing.



THE DUNNE BIPLANE.—As seen from behind.





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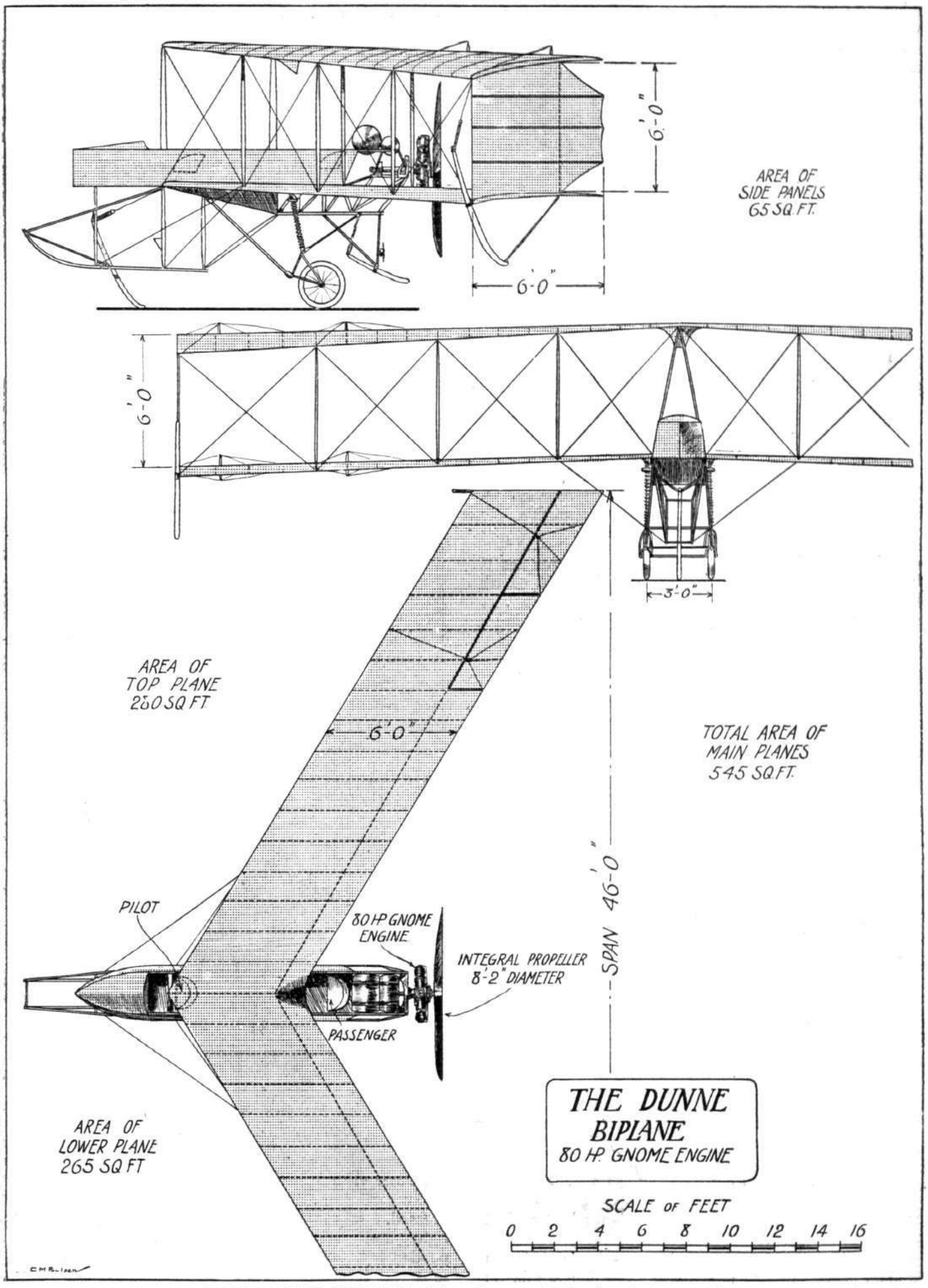
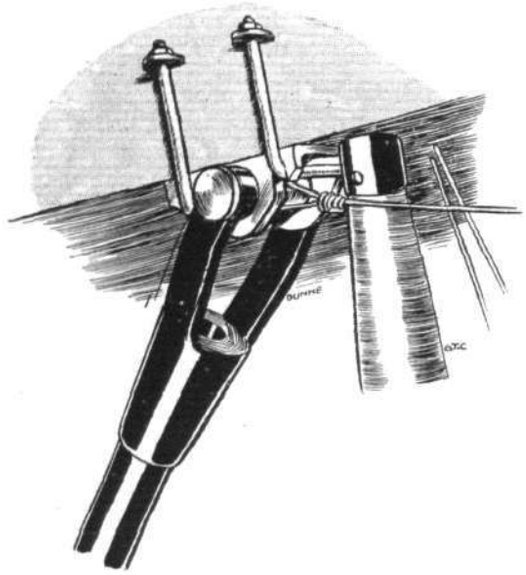
Sketch of the steel portion of the Dunne landing chassis. On the right a detail of the landing chassis, including one of the six universal-joints incorporated in the chassis.



THE DUNNE BIPLANE.—Plan, front and side elevations to scale.

edge, are made of spruce of rectangular section, over which are built the ribs, which have flanges of spruce and webs of whitewood. As has already been said, the angle of incidence diminishes towards the tip, but another point in which the Dunne differs from other machines is that the camber increases towards the tips, the centre ribs being nearly flat, while those at the tip have a very pronounced camber. The joint of the upper main planes occurs at the centre, while the lower planes butt against the sides of the *nacelle*.



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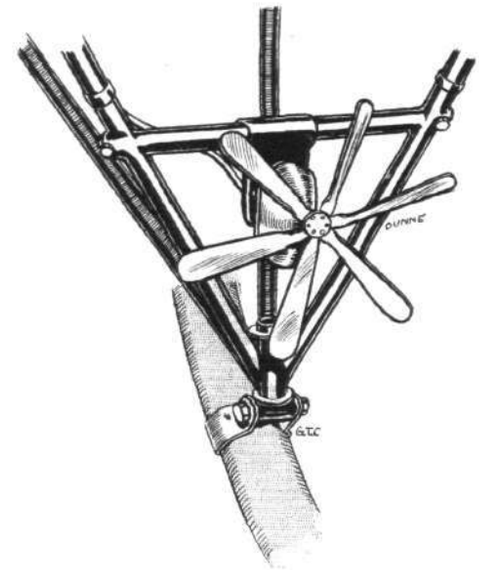
Shows the connection of one of the front steel tubes of the chassis to the *fuselage*.

At the extremities of the wings, and in the gap between the main planes are two side curtains, which are fixed: that is to say, they are not in any way controllable from the pilot's seat. Hinged to the rear spars are four *ailerons*, which at the same time perform the functions of rudders and elevator. For climbing the *ailerons* on both sides are turned up, and the downward pressure thus caused, acting as it does on the part of the wings which lies to the rear of the centre of gravity, forces the nose of the machine upwards, or, more correctly speaking, forces the wing tips downwards, thus causing the machine to climb. For descent the reverse procedure is followed, *i.e.*, the *ailerons* on both sides are depressed. It should be clearly understood that the right and left hand *ailerons* are worked independently, each pair being connected up to a separate lever in front of the pilot's seat. For making a turn, one lever is pulled backwards, while the



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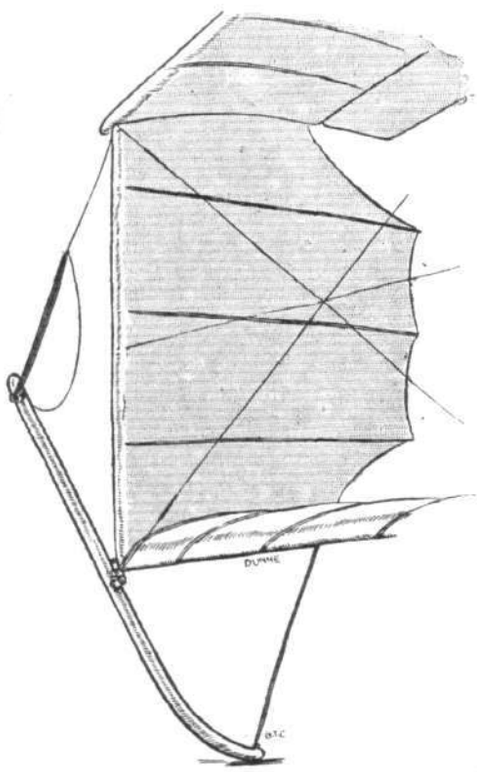
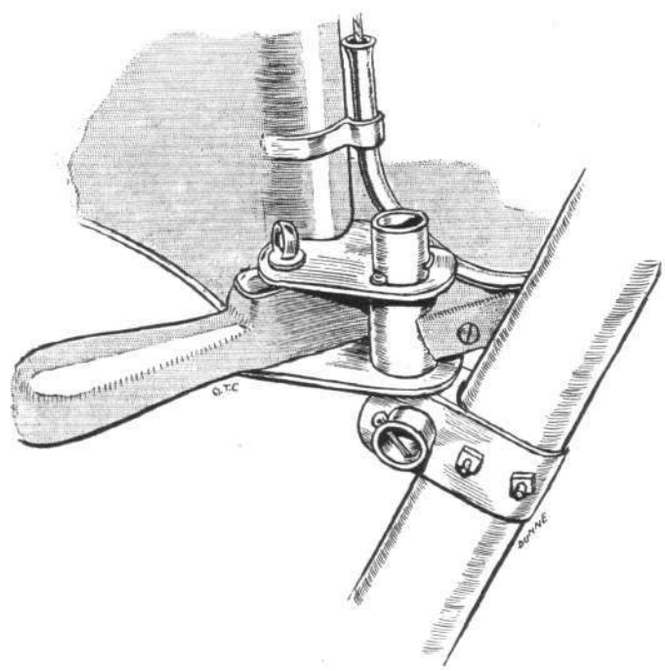
The petrol pressure-pump seen from behind.





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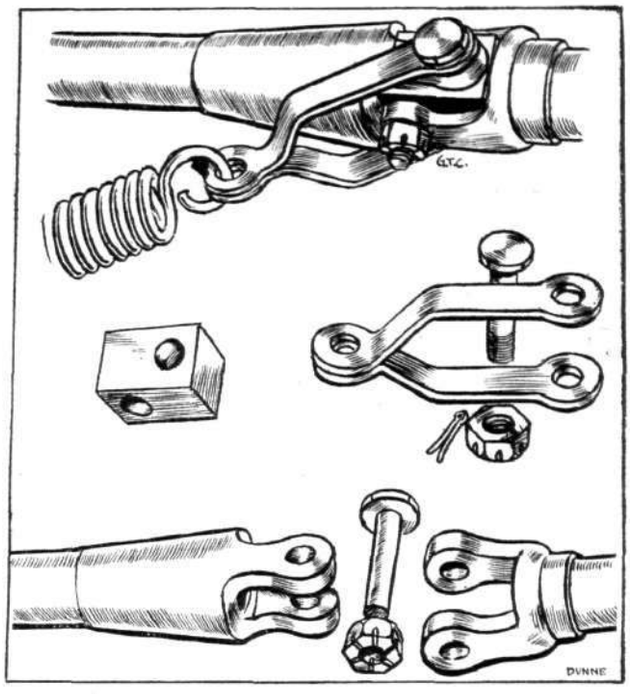
One of the side curtains and wing tip skids, and on right a closer view of the wing tip skid universal-joint.



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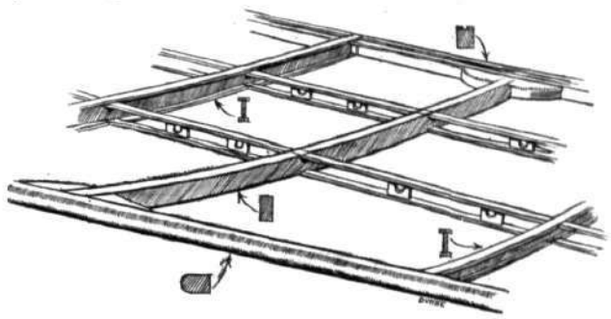
One of the universal-joints, and an analysis of same.

other is pushed forward. Thus, for making a left-hand turn the right-hand lever is pushed forward, while the left-hand one is pulled backwards. The movement is in reality the same as that of turning the steering wheel of a motor car. In the forward part of the *nacelle* is the pilot's seat, from where he has an excellent view in all directions. In front of him is a dashboard with the instruments, whilst the top of the forward part of the *nacelle* is swept upwards to form a deflector, which sweeps the air up over the pilot's head. The passenger's seat is in the rear of the *nacelle*, and situated on top of the main petrol tank. As it is well to the rear of the V formed by the trailing edges of the main planes, the passenger has also an unrestricted view in all directions. In front of the passenger are two control levers, which are interconnected with those in front of the pilot, thus affording dual control, but, while the pilot's control levers can be locked in any position required on the quadrant on which they work, the passenger's levers are always left free so that only the pilot has it in his power to lock the controls. At the rear end of the *nacelle* is the 80 h.p. Gnome engine mounted on overhung bearings, and driving directly a propeller of 8 ft. 2 ins. diameter. On the upper *longerons* of the *nacelle* are mounted the oil tank and a small petrol service tank. Petrol flows from the main tank inside the *nacelle* to a small pump mounted on the rear skid struts, and driven by a miniature propeller. The pump forces the petrol up in the small service tank, whence it runs by gravity to the engine.

The chassis is highly original, although somewhat complicated and, we should be inclined to think, offering a considerable amount of head resistance, but Mr. Dunne finds that its excellent qualities for landing on the roughest ground more than justifies its being retained. As it is fully illustrated in the accompanying sketches, a short description will suffice. The front portion consists of three pairs of struts carrying at their lower extremities two skids, from which is sprung by means of a transverse tube and rubber shock-absorbers another universally pivoted skid which takes the weight of the front part of the machine and prevents it from standing on its nose. To the rear of this portion of the chassis are the wheels, which are also flexibly mounted so that they can "give" in any direction. Springing is effected



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Sketch showing the wing construction of the Dunne biplane.

by means of very powerful coil springs and telescopic tubes. Four steel tubes forming an inverted pyramid carry at their lower extremities another skid which serves to keep the propeller from contact with the ground, whilst the wing tips are similarly protected by two skids mounted on the outer extremity of the lower main plane.

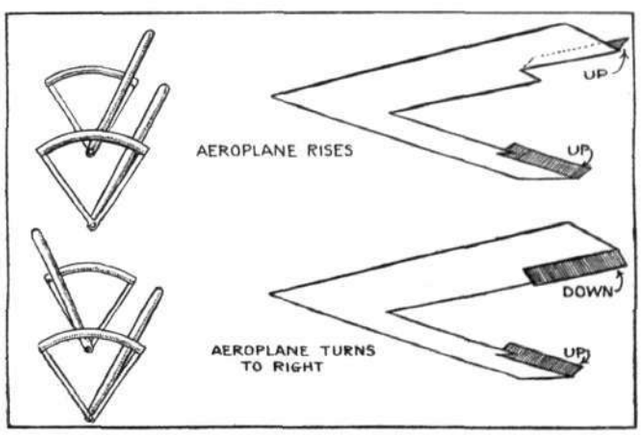

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Diagram to illustrate how steering is effected.

The main petrol tank has a capacity of 22 gallons, and the small service tank holds 4 gallons, while 12 gallons of oil are carried in the oil tank on top of the *nacelle*. The weight of the machine empty is about 1,400 lbs., and her speed is in the neighbourhood of 55 m.p.h.

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Carr's Fine Attempt for Michelin Cup.

FOR the British Empire Michelin Cup, Mr. Reginald Carr, on the Grahame-White char-a-bancs on the 6th inst., made a very fine flight. Starting from Hendon at 8 a.m. he made fifteen complete circuits of the Hendon—Brooklands course, with a stop at each third round, three calls being made at Brooklands and two at Hendon. On the sixteenth round, after leaving Brooklands, at 4.47, he ran into a thick fog at Sudbury and came down in a field. Flares were lighted at Hendon, but Carr decided to give up for the night. He had covered a distance of 315 miles. The machine is fitted with a 100 h.p. Green engine, and during this flight a passenger was carried; the weight in flying order was 3,300 lbs.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Committee Meeting.

A MEETING of the Committee was held on Tuesday last, the 11th inst., when there were present :—Col. H. C. L. Holden, C.B., F.R.S., in the Chair, Mr. Griffith Brewer, Mr. Ernest C. Bucknall, Col. J. E. Capper, C.B., R.E., Mr. G. B. Cockburn, Prof. A. K. Huntington, Mr. F. K. McClean, Mr. J. T. C. Moore-Brabazon, Mr. Alec Ogilvie, Mr. Mervyn O'Gorman, C.B., Mr. C. F. Pollock, Mr. A. Mortimer Singer, Mr. T. O. M. Sopwith, Mr. R. W. Wallace, K.C., and the Secretary.

New Members.—The following new Members were elected :—George H. Blake, A. Graham Clark, Edward T. Newton-Clare and James J. Reilly.

Aviators' Certificates.—The following Aviators' Certificates were granted :—

666 Lieut. Charles Herbert Collet, R.M.A. (Avro Biplane, Central Flying School, Upavon). Oct. 21st, 1913.
667 Capt. Cecil Francis Kilner, R.M.L.I. (B.E. Biplane, Central Flying School, Upavon). Oct. 22nd, 1913.
668 Ordinary Telegraphist Robert Millar Stirling, R.N. (Bristol Biplane, Naval School, Eastchurch). Oct. 22nd, 1913.
669 Artificer Engineer William Foster Floyd (Warrant Officer), R.N. (Bristol Biplane, Naval School, Eastchurch). Oct. 24th, 1913.
670 2nd Lieut. Ralph William Gore Hinds (Royal Inniskilling Fusiliers) (Bristol Biplane, Bristol School, Brooklands). Oct. 31st, 1913.
671 Lieut. William Foster MacNeece (1st Battalion Queen's Own Regt.) (Bristol Biplane, Bristol School, Brooklands). Oct. 31st, 1913.
672 Petty Officer James Fraser Grady, R.N. (Maurice Farman Biplane, Central Flying School, Upavon). Nov. 1st, 1913.
673 First Air-Mechanic William Hedley Butt, R.F.C. (Maurice Farman Biplane, Central Flying School, Upavon). Nov. 1st, 1913.
674 First Air-Mechanic Ernest Edward Copper, R.F.C. (Maurice Farman Biplane, Central Flying School, Upavon). Nov. 1st, 1913.
675 Hugh Nelson, E.R.A., R.N. (Bristol Biplane, Naval School, Eastchurch). Nov. 1st, 1913.
676 Lieut. de Courcy Wyndor Plunkett Ireland, R.N. (Bristol Biplane, Naval School, Eastchurch). Nov. 1st, 1913.
677 Sergt. David Patterson, R.F.C. (Short Biplane, Central Flying School, Upavon). Nov. 4th, 1913.
678 2nd Lieut. George John Malcolm, R.A. (Vickers Biplane, Vickers School, Brooklands). Nov. 5th, 1913.
679 Capt. Thomas Hugh Colville Frankland (Royal Dublin Fusiliers) (Vickers Biplane, Vickers School, Brooklands). Nov. 5th, 1913.
680 2nd Lieut. Sydney Harry Batty-Smith (1st Loyal North Lancashire Regt.) (Vickers Biplane, Vickers School, Brooklands). Nov. 5th, 1913.
681 Sub-Lieut. John Douglas Harvey, R.N. (Bristol Biplane, Bristol School, Brooklands). Nov. 6th, 1913.
682 2nd Lieut. Marcus Winslow Huish, R.F.A. (Bristol Biplane, Bristol School, Salisbury Plain). Nov. 8th, 1913.

Aeronaut's Certificate.—The following Aeronaut's Certificate was granted :—

36. E. J. Protheroe.

Airship Pilot Certificate.—The following Airship Pilot Certificate was granted :—

21. E. J. Protheroe.

Flying to the Danger of the Public.—The following Resolution was unanimously passed :—

RESOLVED that the following prohibitions shall be deemed to form part of the Competition Rules of the Royal Aero Club, and any infringement thereof may be dealt with under such Competition Rules as well as under the Rules of the Royal Aero Club.

1. Flying to the danger of the public is hereby prohibited ; particularly unnecessary flights over towns or thickly populated areas, or over places where crowds are temporarily assembled, or over public enclosures at aerodromes at such a height as to involve danger to the public.

2. Flying is also prohibited over River Regattas, Race Meetings, Meetings for public games and sports, except flights specifically arranged for in writing with the promoters of such Regattas, Meetings, &c.

It was further resolved that the following notice be substituted for the "Important Notice to Aviators" issued in November, 1912, and appearing on page 61 of the "Year Book," 1913 :—

IMPORTANT NOTICE TO AVIATORS.

The Royal Aero Club, being the sole authority under the provisions of the Fédération Aéronautique Internationale for regulating all matters relating to aeronautics and aviation in the British Empire, hereby issues the following notices and regulations to aviators of all nationalities within its jurisdiction :—

1. Flying to the danger of the public is hereby prohibited ; particularly unnecessary flights over towns or thickly populated areas or over places where crowds are temporarily assembled, or over public enclosures at aerodromes at such a height as to involve danger to the public.

2. Flying is also prohibited over River Regattas, Race Meetings, Meetings for public games and sports, except flights specifically arranged for in writing with the promoters of such Regattas, Meetings, &c.

Any disregard of the above prohibitions will render the Aviator liable to censure, fine not exceeding £20, suspension of the Competitor's Certificate, and removal from the Competitors' Register, or render him ineligible for such Register.

International Aero Exhibition, 1914.—The Committee decided to offer Prizes amounting to £50 in connection with the section for model flying machines. Particulars of the various classes for the model exhibits will be announced later.

Manchester Aero Club.—A letter was received from the Manchester Aero Club stating that owing to lack of support in the district, the Club had been disbanded.

British Empire Michelin Cup No. 1, £500.

The Competition for this year closed yesterday, Friday, the 14th inst. At the time of writing these notes, Wednesday, the best performance recorded is that of R. H. Carr on the Grahame-White Biplane, who, on the 6th inst., put up a flight of 300 miles. The actual distance was 315 miles, but the last 15 miles do not count owing to the descent having been made about 5 miles short of Hendon. The other competitor, H. G. Hawker, on a Sopwith Biplane, has now Thursday and Friday in which to endeavour to surpass the distance accomplished by Mr. Carr.

British Empire Michelin Cup No. 2, £800.

The closing date for this competition is November 30th, 1913.

New Premises.

A circular was issued October 15th, 1913, asking Members to give an expression of opinion on the subject of the Club acquiring new premises. Will those Members who have not already done so, kindly reply to the two questions set out in the circular, as early as possible?

Lecture by Mr. Roger W. Wallace, K.C.

Mr. Roger W. Wallace, K.C., will deliver a lecture on "The Right to Fly" at the Royal United Service Institution, Whitehall, S.W., on Wednesday, November 19th, 1913, at 8.30 p.m. The Aeronautical Society has kindly placed a number of tickets at the disposal of the Club and Members wishing to attend the lecture are requested to apply to the Secretary of the Royal Aero Club.

Geisler Challenge Trophy Appeal.

The Stewards of the Royal Aero Club met on Thursday, November 6th, and Tuesday, November 11th, 1913, when there were present : Hon. Arthur Stanley, M.V.O., M.P., in the Chair, Brig.-Gen. David Henderson, C.B., D.S.O., and Sir Charles Henry, Bart., M.P., to hear the appeal of the Grahame-White Aviation Co., Ltd., against the withdrawal on May 11th, 1913, of Brindejonc des Moulinais' Competitor's Certificate.

The three contentions put forward by the Grahame-White Aviation Co. were as follows :—

1. That the Stewards of the meeting, in allowing M. Brindejonc des Moulinais to start and awarding him the prize, over-ruled what appeared to be a communication, the text of which created a precedent, which was *ultra vires* and not in keeping with the rules of the Club.

2. That there was no evidence to show that M. Brindejonc des Moulinais' flight over London was "unnecessary."

3. That the action of the Club was an illegal one, and that the Committee had no power to withdraw M. Brindejonc des Moulinais' Competitor's Certificate without first giving him an opportunity of appearing before them to explain his conduct.

The Stewards of the Royal Aero Club find—

1. That the Stewards of any meeting have no power to over-ride decisions of the Club properly communicated to them.

2. That M. Brindejonc des Moulinais' flight over London was "unnecessary" and involved "danger to the public."

3. That the power to withdraw a Competitor's certificate is vested in the Committee of the Club. By the Club rules the Committee must be duly assembled (Rule 11) and there must be a quorum of 5 (Rule 12). It appears in this case that the Committee was not duly assembled and that there was not the necessary quorum of members present.

Under those circumstances, the Stewards have no option but to declare that the withdrawal of M. Brindejonc des Moulinais' Competitor's Certificate was not in order, although they wish at the same time to express their opinion that it was justified, and is only overruled on a technical point.

The Geisler Challenge Trophy and Prize is awarded to M. Brindejonc des Moulinais.

At a subsequent meeting of the Committee, held on May 20th, in conformity with Rules 11 and 12, M. Brindejonc des Moulinais' Competitor's Certificate was withdrawn. This decision is upheld.

166, Piccadilly, W. HAROLD E. PERRIN, Secretary.

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Eastchurch Flying Grounds.

AN enormous amount of flying has been done during the past week, despite the weather conditions, and some fine feats of airmanship have been witnessed. All the usual machines have been out, Shorts, Avros, Bristol, Sopwith, Deperdussins, Blériot, and Maurice Farman. The pilots have been Lieut. Davies, R.N., Eng.-Lieut. Briggs, R.N., Lieut. Miley, R.N., Lieut. Osmond, R.N., Lieut. Finch Noyes; Sub-Lieuts. Marix, Littleton, Young, Rainey, and Pierce; Captains Barnby, Courtney, and Lushington.

The Bristol tractor and the 100 h.p. Avro have been flying well, Sub-Lieut. Rainey having charge of the former while the latter has been piloted by Sub-Lieut. Pierce. A new Henry Farman biplane arrived during the week.

On Thursday three army machines arrived at the aerodrome—a Henry Farman 393, Blériot 292 and Sopwith 27, and this number was further reinforced by the arrival of another Henry Farman on the following day. Thursday last was a very busy day, especially in cross-country flights. Machines with pilot and observer departed in all directions, while some patrolled the neighbouring coastline, in connection with the manœuvres, frequently returning to the aerodrome to report.

Mr. F. K. McClean had his new large 160 h.p. Short machine out during the latter part of the week, several nice flights being satisfactorily accomplished. The machine makes an imposing sight in the air owing to the struts, planes, &c., being white. The machine is fitted with a self-starting arrangement to the engine, and for the preliminary trials land wheels were fitted, the intention being to fly the machine to Mr. McClean's hangar at Harty and there affix the floats.

Brooklands Aerodrome.

ON Tuesday last week Mr. Hucks arrived from Hendon on his Blériot monoplane with a passenger, returning to Hendon again after a short stay.

Major Higgins, R.F.C., came in on an Avro single-seater biplane (50 h.p. Gnome), and made a short stay, during which he had a trip on a Sopwith machine.

On Thursday a 70 h.p. Sopwith biplane set out for Eastchurch for delivery to the Naval authorities at that place. Mr. Carr, on the Grahame-White char-a-bancs fitted with the late Col. Cody's 100 h.p. Green engine, made an attempt for the Michelin Prize with a passenger on the Hendon–Brooklands course, covering 315 miles.

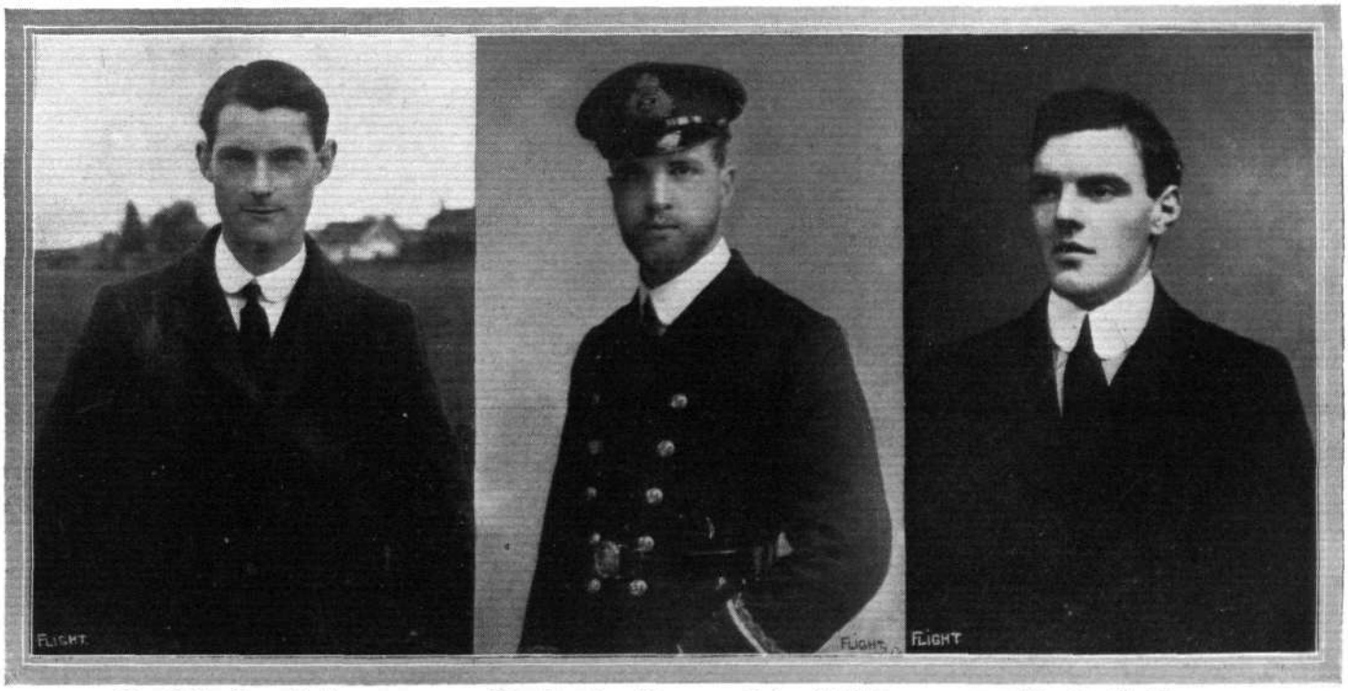
On Saturday in a 30 mile an hour wind, Mr. Barnwell flew to Hendon with a view to competing in the Hendon to Shoreham and back race, in which, however, on the return journey he had to abandon his attempt owing to the late hour at which he was compelled to leave Shoreham, and flew straight to Brooklands, where he arrived at dusk after experiencing considerable difficulty in locating the aerodrome. Mr. Raynham was already at Hendon for the race, and he, too, had to retire from the contest when his chance of winning was quite a good one.

On Sunday there was some very fine flying. The Handasyde machine was early in the air, followed by the Sopwith biplane. Mr. Raynham on the Avro biplane suddenly appeared out of the clouds at a considerable height, and executed one of his graceful spiral descents. Mr. Dukinfield Jones was flying well on the Flanders biplane. Mr. Merriam and his pupils were busy on two Bristol biplanes. The winner of the ballot for the free passenger flight was Miss Lehrmann, of Bailey's Hotel, London, who was taken up by Mr. Raynham on the Avro biplane.

Bristol School.—Merriam out first alone on Monday last week waking pupils up; later sitting behind Lieut. Robertson on several straights and circuits. This pupil is very good and ready to go alone. Lieut. Warren and Mr. Macdonnell a solo each, the latter doing another short flight in a stiff breeze.

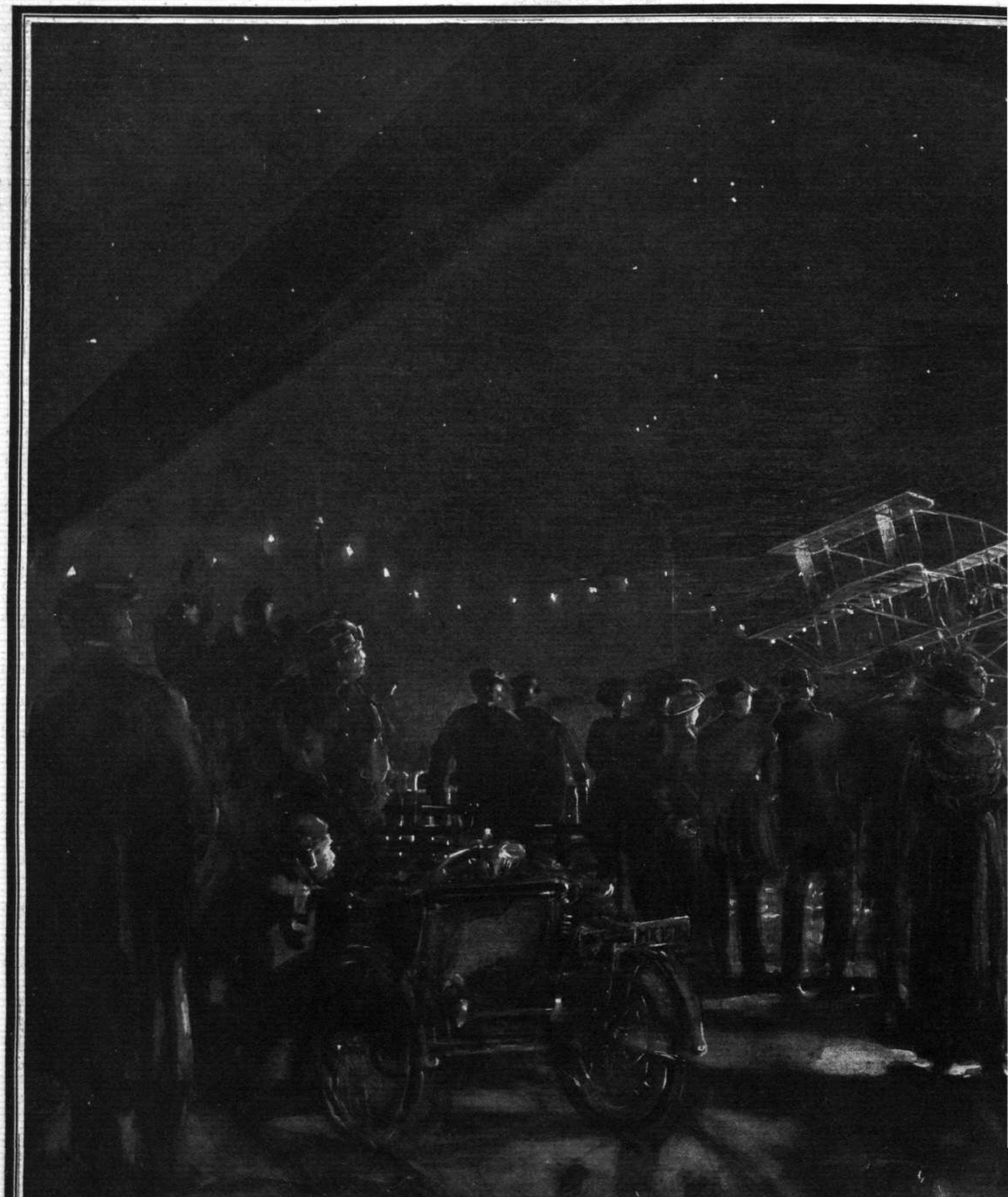
In the afternoon Merriam for test found too bumpy. Later tried again taking Lieut. Macdonald (new pupil) for his first trip.

Foggy early Tuesday morning, cleared later, and Merriam for



Mr. Colin Layzell-Apps. Mr. Vyvian Harcourt Coles, R.N.R. Mr. R. K. Pierson.

Three more Vickers pilots who have recently secured their Royal Aero Club *brevets* at the Vickers Flying School, Brooklands, in excellent style.



NIGHT FLYING, NOVEMBER 5TH, AT HENDON.—Claude

ame-White flying a Maurice Farman biplane. From a drawing by Mr. Roderic Hill.

test, then behind Lieut. Robertson on straights and circuits. Afterwards up with Lieut. Macdonald. Fog became thick again. Later on Lieut. Warren for solo. Merriam then up with Lieut. Macdonald on several circuits at a good height. Merriam up again taking Lieut. Macdonald as passenger, and found bumpy, later tried taking Lieut. Palmer (new pupil) as passenger and found still very bad. Too windy for flying on Wednesday morning.

In the afternoon Merriam first out. Afterwards up with Lieut. Harvey, showing him figures of eight. Afterwards up with Lieuts. Palmer and Macdonald. Solos were executed by Messrs. Macdonnell, and Finny, and Lieut. Warren.

Darkness prevented further flying.

Windy first thing on Thursday, but later became calm.

Merriam test then behind Lieut. Harvey on several straights and circuits, figures of eight and landing practice, afterwards up behind Lieuts. Bridson, Palmer and Macdonald. Mr. Macdonnell and Lieut. Warren a solo each. Mr. Macdonnell a solo. Merriam solo, afterwards up again giving Lieut. Harvey landing practice (from behind). Wind stopped further flying.

Merriam testing on Friday, afterwards up behind Lieut. Bridson and Lieut. Macdonald. Messrs. Finny and Macdonnell and Lieut. Warren figures of eight each alone. Too bumpy later for more. Wind ceased later, Merriam test, afterwards behind Lieuts. Bridson, Palmer and Macdonald. Mr. Macdonnell figures of eight alone.

Vickers School.—Monday, last week, Paterson test biplane 20. Mr. Hinshelwood straights. Messrs. Pelham and Malcolm circuits. Barnwell on biplane 26 with Lieut. Barton. In afternoon, Barnwell testing biplane 26 in bumpy wind.

Knight on biplane 26 with Mr. Hinshelwood and on biplane 20 with Lieut. Barton, Tuesday. Mr. Malcolm eights. This pupil then went for his *brevet*, but only got through first half, as wind was getting up badly.

Wednesday afternoon, Barnwell test biplane 20. Messrs. Malcolm and Pelham circuits. Mr. Malcolm then went through the second half of *brevet* in good style. Messrs. Frankland and Batty-Smith also for *brevets*.

In morning, Thursday, Knight on biplane 20 with Messrs. Barton and Lee, Paterson with Lieut. Barton, Mr. Hinshelwood solo circuits, Barnwell testing biplane 26. In afternoon, Knight on biplane 20 with Messrs. Barton and Lee, Messrs. Macdonell and Barton solo straights, Mr. Hinshelwood circuits, Mr. Morgan straights No. 3 mono., Messrs. Chataway, Joubert de la Ferte, and Webb, straights on No. 5 mono.

Messrs. Hinshelwood, Macdonell and Barton alone on biplane 20, Friday. Messrs. Webb, Chataway, Joubert de la Ferte, Elsdon and Newton-Clare, solos on No. 5 mono. In afternoon, Messrs. Hinshelwood, Barton and Macdonell, solos on biplane 20. Messrs. Webb, Joubert de la Ferte, Chataway and Newton-Clare, solos on No. 5 mono.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Mr. Norris straights and circuits, Monday, last week, Messrs. Howarth, Von Segebaden and Clarke, straights, with Instructor Manton in passenger seat.

Tuesday, Messrs. Norris, Webb, Von Segebaden, Kershaw, Clarke and Howarth, straights with Instructors Manton and Birchenough. Mr. Cripps, straights and circuits with Instructor Noel, afterwards solo straights and circuits. Mr. Draper solo circuits, spirals, &c.

W. H. Ewen School.—On Monday, last week, school out at 7.10 a.m. Test flight by Mr. Baumann on *brevet* machine, after which Mr. Scott did circuits and Messrs. Badgery and Johnson straight flights. On 35 h.p. Caudron No. 2, Mr. F. W. Goodden was instructing Messrs. Cowling, Johnson and Lieut. Fraser, who were doing straights, and Messrs. J. Bankes-Price, Wigget and H. A. Cooper, who were rolling. Mr. F. W. Goodden made a test flight on 45 h.p. Caudron biplane to 800 ft.

School out at 4 p.m. Tuesday. After test by M. Baumann, Mr. MacGregor doing half-circuits, and Mr. Scott circuits in good style. M. Baumann also out on 60 h.p. Caudron. Mr. F. W. Goodden made a 20 minutes flight on 45 h.p. Caudron. On 35 h.p. Caudron No. 1 Mr. Goodden was instructing Lieuts. Fraser and Kinnear and Mr. Cowling who were doing straights, and Messrs. Wigget, Bankes-Price and Cooper, who were rolling.

It was too windy for pupils on Wednesday. Mr. Baumann was testing 45 h.p. Caudron biplane during morning, and Mr. Goodden was at 4 p.m. testing 45 h.p. Caudron biplane, rising to an altitude of 1,500 ft. Mr. Baumann gave exhibition flight on Thursday on 60 h.p. Caudron, rising to 7,000 ft., and Mr. F. W. Goodden on the 45 h.p. Caudron made a flight lasting three-quarters of an hour, rising to an altitude of 8,500 ft.

Salisbury Plain.

Bristol School.—Voigt gave biplane tuition to Capt. Hay and Lieut. Harrison on Monday, last week. Weather unfit for tuition in the evening.

On Tuesday, Voigt a trial on a biplane, and then followed excellent solos by Lieut. Marsh; on one he reached a height of 100 ft. Lieut. Huish, Mr. Courtney and Lieut. Harrison one each. Jullerot took for tuition Capt. Walcot, and a trip to an old pupil (Lieut. Head). Jullerot a trial on tandem monoplane. Later in the morning Voigt made a long trial on biplane, but reported too bumpy for tuition.

Voigt a trial on a biplane and Jullerot also. Jullerot then took for tuition Capt. Walcot. Biplane solos were executed by Capt. Hay and Lieut. Harrison.

On Wednesday Voigt a trial and then tuition to Lieut. Huish. Voigt gave biplane tuition to Capt. Walcot and to Lieut. Harrison landing practice.

Voigt a test on Thursday on the biplane and followed with good solos by Lieut. Marsh and Mr. Courtney. Mr. Voigt another solo. Too windy to proceed with tuition. In the evening, Voigt with Capt. Hay and Air-Mechanic Locker for biplane tuition when rain put stop to flying. The storm over Voigt again giving biplane tuition to Air-Mechanic Locker and Lieut. Harrison, rain again prevented continuation. Too windy on Friday for flying.

Shoreham Aerodrome.

OWING to the strong wind prevailing during the early part of the week, no school work was possible.

On Friday afternoon Mr. Elliott was out on the 45 h.p. Avro, doing circuits and fine banked turns. Afterwards, Mr. Cannon was out for 15 mins., doing excellent straights. Saturday, as soon as the competitors in the race from Hendon and back had started on their return journey, Elliott was again out, doing circuits for 20 mins.

On Monday Elliott tested the air at mid-day and found wind very gusty, but did good figures of eight at 400 ft., and at 3 p.m. went out for first half of his ticket tests, doing the eights in fine style at a good 800 ft. in a considerable wind.

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AN "ENTENTE CORDIALE" AVIATION COMPANY.

THIS week a prospectus was issued inviting subscriptions for the capital of the Franco-British Aviation Co., Ltd., of which the directors are Mr. Reginald Mortimer, Capt. A. W. Gamlen, R.N.R., Engineer-Capt. A. R. Rolle, R.N., and Lieut.-Col. E. J. de Salis, the managers of the company being Capt. Andre Beaumont and Mr. Louis Schreck. Briefly the object of the Company is to construct waterplanes, more particularly those pertaining to the business of Mons. H. Leveque and of the Société Tellier, both of which businesses the company are acquiring, whilst they also hold a licence for the construction and sale in France of the Curtiss flying boats with further rights to sell in other parts of the world, with the exception of England, Russia, Italy and the U.S.A.

At a luncheon for the purpose of inaugurating the launching of the Company, which was held at Prince's Restaurant on Monday, Lieut.-Col. de Salis presided in the absence of the Chairman of the Company, when he offered a short explanation of the main reasons for the foundation of this constructing firm. Col. Salis pointed out that the Company being founded with the idea of its being thoroughly patriotic, rather than primarily commercial, it would be their endeavour to handle the very best machine and the very best engine it was possible to get, with the object of bringing England into the forefront in regard to service aviation. What they proposed to do was to reverse the order of things which had held good for so many years in the past, in which various foreign governments had profited by the enormous expenditure of Great Britain in building the most efficient form of warship. They intended taking advantage of the experiments which had been so progressively carried out in other countries in regard to aviation, where the art, there was little doubt, had gone ahead so well, owing to the official encouragement which they had received. All the directors, said the Chairman, were associated with the Company mainly in the capacity of patriotic supporters of the United Kingdom, and with a man like Capt. Beaumont, with Mr. Louis Schreck, in charge of the management, he thought that they should accomplish vast good in this connection.

M. Beaumont said that he attached the very greatest importance to the Company adhering to the boat principle of waterplane, a type to which they had decided to pin their faith for the present.

Mr. Ledeboer, in replying for the Press, laid strong emphasis upon his views in regard to the future of the waterplane, which he was convinced lay in its increased size rather than the small machines which at present were in vogue, Mr. C. G. Grey also agreeing with this view of the future.

A vote of thanks to the Chairman closed a very pleasant gathering of men who were all intent upon upholding the *entente cordiale* so far as aviation is concerned.

FLYING AT HENDON.

Night Flying Demonstration.

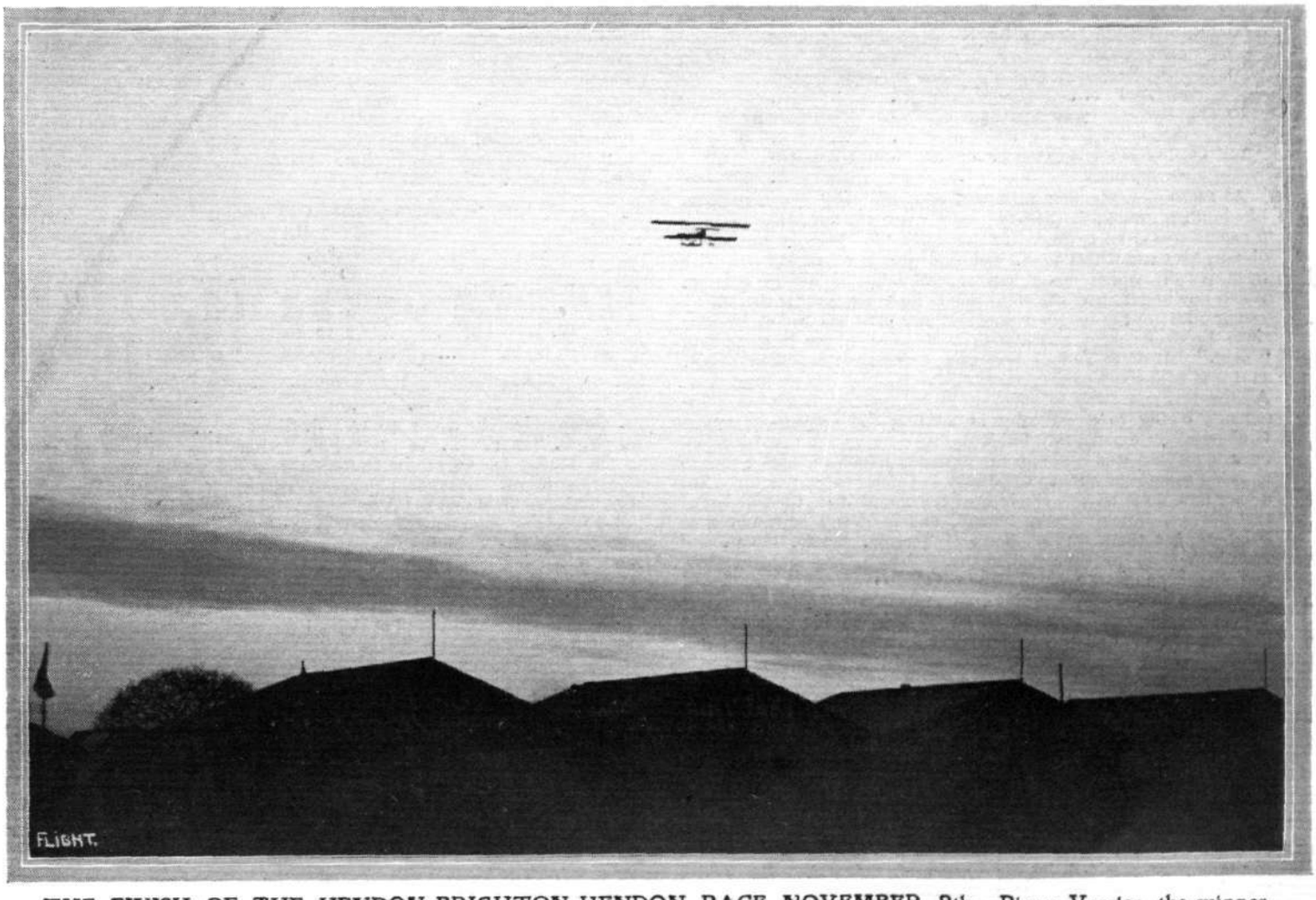
ON Thursday evening of last week a very successful night flying demonstration took place up at Hendon aerodrome. It differed from those previouly held in that a speed handicap was flown in the dark for the first time on record. Earlier in the evening it was rather showery, but later it turned out bright and clear, and a fairly large number of visitors turned up. As usual, the aerodrome was illuminated with numerous fairy lamps, and a realistic model of a cruiser "lay to" in the centre of the aerodrome. The first to ascend was Marcus D. Manton on the 50 h.p. G.-W. double-rudder 'bus. He made several circuits of the aerodrome, sometimes in complete darkness and sometimes with the rows of tiny electric lamps that bedecked his machine brilliantly lit up. After this flight of Manton's, which lasted some 15 mins., Pierre Verrier came out on his Maurice Farman and demonstrated that darkness in no way prevented him from executing some of his wonderful banks. R. H. Carr, on a 50 h.p. G.-W. 'bus, and Louis Noel, on the 70 h.p. G.-W.-Maurice Farman, next gave exhibitions, after which a start was made for the speed race. This was flown over four laps of the aerodrome, and was made up of R. H. Carr (56 secs.), Marcus D. Manton (26 secs.) on 50 h.p. G.-W. 'buses, and Louis Noel (scratch) on the 70 h.p. Maurice Farman. This race was undoubtedly the most sensational event that has been seen at Hendon, for the three machines were not only well matched, but raced close together the whole time, finishing in a bunch—and this in the dark! Noel gradually caught up Carr and Manton and passed them just in front of the finishing line, beating Carr by 1 sec. Manton very nearly got in second, and only failed by a bare $\frac{1}{5}$ sec. After the race W. Birchenough ascended on the 50 h.p. G.-W. 'bus, and then followed a bombardment of the "cruiser" from the air. The aeroplanes, of course, proved victorious, for eventually the "cruiser" was seen to be in flames and finally "blew up" in magnificent style—thanks to J. W. Wells and Sons. The figures of the speed race are as follows:—

First Night Speed Handicap. (4 laps.)

		Handicap.	Handicap Time.
		m. s.	m. s.
1.	Louis Noel (70 h.p. Renault-Maurice Farman biplane)	scratch	8 40
2.	R. H. Carr (50 h.p. Gnome-Grahame-White biplane)	0 56	8 41
3.	Marcus D. Manton (50 h.p. Gnome-Grahame-White biplane)	0 26	8 41$\frac{1}{5}$

The Hendon-Brighton-Hendon Air Race.

Last Saturday's race from Hendon to Brighton and back was an excellent example of the wonderful progress that has been made in aviation, for taking into account the time of the year, and the very unfavourable weather conditions that prevailed on the day in question, it is something to marvel at that a race of this description should be held at all, let alone the fact that half the number of starters successfully completed the course. This race has also shown that the long distance cross-country handicap can be flown with as much success as a speed handicap round an aerodrome, and we think that further events of this character should be held, if not this year, next season. This brings us to the question of handicapping, and once again we have to compliment those responsible for this ticklish subject on Saturday's event, for the competitors that finished did so one close upon the other. Originally the race was to have commenced at 11 o'clock; it was, however, far too unsettled at this time for a start to be made, but there was every indication of it clearing up. In fact, at 11.15 it brightened considerably, and Marcus D. Manton went up on the 50 h.p. G.-W. 'bus to see what it was like up above. He climbed



THE FINISH OF THE HENDON-BRIGHTON-HENDON RACE, NOVEMBER 8th.—Pierre Verrier, the winner, returning to Hendon late in the evening.

for about 15 minutes and then descended with a fine spiral. As he landed, H. Barnwell arrived from Brooklands on the 120 h.p. Martinsyde monoplane, which he was, through the courtesy of Messrs. Vickers Ltd., to pilot in the race. After this, up to just before noon, test flights were made by some of the competitors—Hamel, Verrier, Raynham, Brock, and Temple. The latter was not so successful with his trials as the others, for he had fitted a new petrol tank just behind his seat, which made the machine too tail-heavy, so that he could not keep it up. He also burst a tyre and had to fit a new wheel; all this delayed him in getting ready to start, as will be seen later. There were two trophies (together with a 1st prize of £100, and a 2nd prize of £25) presented by the Sussex Motor Yacht Club to the winners of the handicap, and the other presented by Mr. Barclay Walker to the pilot who made the fastest time, there also being first and second prizes of £50 and £25 respectively. Competitors were to leave Hendon according to their handicap, and make for Harrow Church, after which, a straight course would be set for Brighton. On reaching Brighton they had to pass over the race-course, along the sea-front to the Palace Pier head, where their times were taken. After this they had to go to Shoreham aero-drome, where a landing could be made, and where, after a brief stay, they started for the return journey, passing over the same course, and starting in the order of their arrival at the Palace Pier. Of the 11 entrants, 9 were ready to start, the 2 non-starters being R. H. Carr, whose 50 h.p. G.-W. tractor biplane was not quite ready, and Louis Noel, who with his usual bad luck had to retire at the last moment through a broken inlet-valve. The 9 starters and their handicaps were as follows:—

		Handicap. h. m. s.
2	Pierre Verrier (70 h.p. Renault-Maurice Farman biplane)	1 4 14
4	George Lee Temple (50 h.p. Gnome-Blériot monoplane)	0 53 44
5	G. M. Dyott (50 h.p. Gnome-Dyott monoplane)...	0 32 47
6	Walter L. Brock (80 h.p. Gnome-Blériot 2-seater monoplane)	0 22 26
7	Philippe Marty (50 h.p. Le Rhone-Morane-Saulnier monoplane)	0 20 30
8	Robert Slack (80 h.p. Le Rhone-Morane-Saulnier monoplane)	0 16 23
9	F. P. Raynham (80 h.p. Gnome-Avro tractor biplane)	0 15 10
10	H. Barnwell (120 h.p. Austro-Daimler-Martinsyde monoplane)	0 5 26
11	Gustav Hamel (80 h.p. Gnome-Morane-Saulnier monoplane)	Scratch

At 12.29 p.m. the first man was sent off. He was practically lifted off the ground by the wind, and when up remained in view for some considerable time. In the meanwhile Temple decided to discard his extra petrol tank, and replenish his existing one with fresh petrol, which made him several minutes late in starting. When he did get away the wind was at its worst, so that the plucky young pilot got the roughest time that any pilot has had at Hendon since Brock went to Brooklands in a gale on the little 35 h.p. "Dep." At times Temple was turned almost completely round, so it was with some anxiety we saw him finally disappear from view. All the rest got away in excellent style, although Slack lost a few seconds owing to a difficulty in starting the engine—at which Grahame-White had a turn himself. As soon as the last man had departed a start was made for the luncheon handicap, and a few of us being somewhat hungry some very fast times were put up. For a long time no news was received of the competitors, then we heard that Verrier, Brock, Slack, Hamel, and Barnwell had arrived at Brighton, but there was no news of Temple, Marty, Dyott, and Raynham. By this time it was three o'clock, and Manton, Carr, and Birchenough got through some exhibitions on the G.-W. 'buses. At about 3.30 a monoplane was seen approaching the aerodrome at a great height. This proved to be Temple on his Blériot. He descended in a spiral, and finished up with an extra steep dive, and after landing informed us that his compass came adrift, and fell into his lap, so he decided to return. He made a landing at Hounslow, on the drill ground, where he got a good reception from the military, after which he made a start for Hendon. Another exhibition was then given by Noel on the Maurice Farman, which was now all right as far as the engine was concerned, but in order to keep up Noel's reputation for bad luck, promptly broke its elevator stay wires, and so again "rested" for a while. Another machine was then seen above the aerodrome, some 10,000 ft. up; this turned out to be Raynham on the Avro. He made a beautiful descent, lasting some six or eight minutes. When he landed he informed us that he was catching up Brock and Slack, but when over Horley, at a height of 10,000 ft., the wire controlling the air-valve of his car-burettor broke, and his engine came to a standstill. The ground immediately below him was thickly wooded, and he could not see a suitable place to land. However, he glided down as flat as he could, and at last saw a small field some little way off. He just managed to reach this, and by dodging between two trees and over a hedge he effected a safe landing. After Raynham's return to Hendon, Carr took up the 100 h.p. Green-G.-W. five-seater biplane, and shortly after, a few minutes before 5 o'clock, Verrier's biplane was seen approaching from Harrow. He had no sooner landed than two monoplanes were seen coming home. These were Hamel and Brock. Shortly after, Slack crossed the line and so brought the race to a close, for Barnwell landed at Brooklands, as not being acquainted with the lie of the land round about Hendon, he, in accordance with Messrs. Martin and Handasyde's wishes, when the start was so late, decided not to continue the course owing to the failing light. The day's events were brought to a close by a splendid flight in semi-darkness by E. Whitehouse on the new 100 h.p. Anzani-Handley Page biplane. This machine is a tractor machine with staggered H.P. crescent-shaped main planes having a rather flat camber. The machine flies in a remarkably steady manner, and appears to be very fast. Below we give the times of the Brighton race in tabulated form. Marty had to land at Ealing owing to engine trouble, and Dyott, after making very good time for nearly the whole of the outward journey mistook his bearings, and thinking he was going too much to the west turned, and with the 40-mile wind behind, soon found himself near Eastbourne. The wind caused him a good deal of trouble when he attempted to fly back along the coast, and eventually Dyott decided to land on Beachy Head. He came down, and the machine had very nearly ceased to roll, when it was lifted by a gust of wind. As it was recovering from this, another gust, such as can only be found at Beachy, apparently coming from the opposite direction, turned the machine over, with but little damage to the same and none to the pilot. Hard lines, Mr. Dyott, better luck next time.

Hendon–Brighton–Hendon Handicap. Result.

		Brighton. Arr. h. m. s.	Brighton. Dep. h. m. s.	Hendon. Arr. h. m. s.
1.	Pierre Verrier	1 45 16	3 16 0	4 40 11
2.	Gustav Hamel ...	2 22 14	3 53 58	4 44 56
3.	W. L. Brock	2 12 19	3 43 3	4 45 36
4.	R. Slack	2 14 26	3 45 10	4 54 10

Barclay Walker Trophy. Fastest Time.

	h. m. s.		h. m. s.
1. Gustav Hamel ...	1 40 14	R. Slack	2 5 51
2. W. L. Brock ...	2 3 20	P. Verrier	2 39 43

On Sunday several exhibition flights were put up by most of the Hendon pilots. Raynham gave an interesting demonstration of fast and slow flying on the Avro, the speed range being about from 35–70 m.p.h. The new Handley Page biplane was out again and the 5-seater G.-W. biplane also put in some flying. Brock, on his 80 h.p. Blériot, when flying with a passenger had a very narrow escape, his foot slipping off the rudder-bar when descending, causing the machine to dive in an alarming manner, and it was only by absolute skill that the pilot righted the machine just in time to avoid a serious accident.

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The Paris–Cairo Flight.

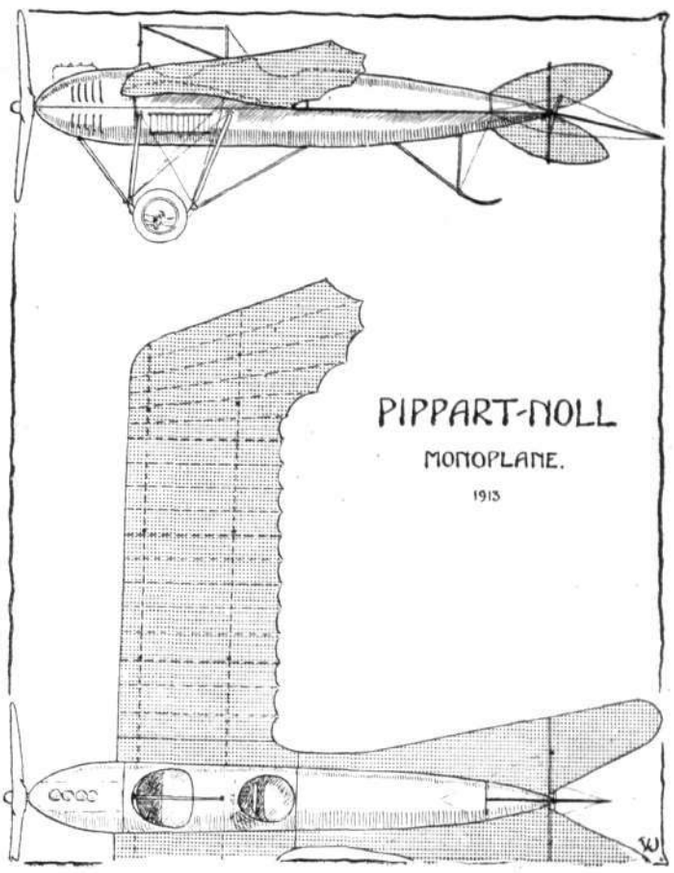
THE first part of Daucourt's flight from Paris to Cairo ended on Sunday with the arrival of the aviator and his companion at Constantinople. As recorded in last week's FLIGHT, they arrived on Tuesday week at Craiova and the next day went on to Bucharest, being accompanied for the last part of the way by some of the Roumanian pilots. The next day Varna was reached and there the aviators were received by the Queen of Bulgaria. On Friday morning a start was made for Constantinople, but owing to the wind a stop for fresh supplies had to be made at Burgas. When the storm had abated, another attempt was made to reach the Turkish capital, but being overtaken by darkness a descent had to be made at the first available spot. This proved to be a little fishing village on the Black Sea called Podima, and as there is no post office within forty miles, the aviators could not inform their friends as to their whereabouts. It was not until Sunday afternoon that the weather had moderated sufficiently to allow Daucourt to get away and he then flew the remaining short distance at a good turn of speed. The landing was effected at the San Stefano aerodrome, the aviators being welcomed by the French Ambassador and representatives of the Turkish Government.

AEROPLANE TYPES.

THE PIPPART-NOLL MILITARY MONOPLANE.

IT cannot be denied that many of the aeroplanes produced in Germany are original in design, so far as other countries are concerned, at any rate. Many German and Austrian manufacturers have adopted the Etrich system of wing form either in its initial design, or modified, as in the case of the Pippart-Noll monoplane. This machine has been designed to meet the German military requirements, and has proved to be a successful flyer. With a 70 h.p. Argus engine it is capable of ascending to a height of about 350 m. in 3½ mins. The *fuselage* is in the form of a well-defined torpedo, being slightly greater in depth than in width. Two cock-pits are provided for pilot and two passengers, the latter being situated right forward side-by-side, where an excellent view may be obtained down over the front of the main planes. The pilot also has a good view below, being situated level with the trailing edge of the main planes. As previously mentioned, the main planes somewhat resemble the Etrich type in that the wing tips at the trailing edge extend a little to the rear, but they differ from the type in question by being slightly swept back in the form of a V, or arrow. The wings are set at a fairly pronounced dihedral angle. A peculiar feature consists of the *empannage*, or tail, which, to all intents and purposes, is an extension of the main planes extending rearwards on either side of the *fuselage*, and terminating with two hinged elevator flaps. The landing chassis is very strong and consists of two U steel-tube struts carrying the spring axle and wheels. The principal dimensions of the 1913 military-type machine are as follows:—Span, 13·700 m.; length, 8·800 m.; supporting area, 28 sq. m.; weight, empty, 560 kilogs.; speed, 80–110 k.p.h.

"VEE JAY."



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BRITISH NOTES OF THE WEEK.

Sir Hiram Maxim Lectures.

AT a meeting of the Scottish Aeronautical Society at Glasgow on the 5th inst., at which the Duke of Argyll, K.T., presided, Sir Hiram Maxim gave a lecture, entitled "Early Experiments." After dealing fully with his experimental work in connection with aviation, Sir Hiram Maxim indulged in a little speculation as to the use which would be made of aeroplanes in war. He thought that the aeroplane must necessarily mark the beginning of a new epoch in the relations of civilised nations with each other. Kings and emperors would not be disposed to go to war with their neighbours if they knew that their own capital might be attacked and destroyed in a few hours after the declaration of war. The aeroplane would, therefore, do much to stop war altogether between the highly civilised nations of the world—a thing very much to be desired.

An Exciting Time at Montrose.

THE officers of the Royal Flying Corps stationed at Montrose get some thrilling moments. Last week Capt. Longcroft, on a B.E. biplane, made a flight against an 80 m.p.h. wind, and after three-quarters of an hour, during which the speed indicator pointed to 75 m.p.h., the machine was driven back three miles. The machine rocked very considerably in the gale, and Capt. Longcroft had the greatest difficulty in landing, but this he eventually accomplished after about an hour's work.

The R.F.C. at Dover.

THREE more machines, two H. Farmans and a Blériot, arrived at the temporary military aerodrome on Swingate Downs, Dover, on Wednesday last week, having been flown over from Salisbury, with a stop *en route* at Shoreham, by Lieuts. Cholmondeley, Stopford and Conran respectively, each with a mechanic as passenger. During the afternoon a very large number of passengers were taken up by the R.F.C., and the next day two of the machines were flown over to Eastchurch.

"The Right to Fly."

THIS is the subject of the lecture to be given by Mr. Roger Wallace, K.C., before the Aeronautical Society on Wednesday next, the 19th inst. The Hon. Mr. Justice Atkin will preside at the meeting, which will be held at the Royal United Service Institution, commencing at 8.30 p.m.

Secretaryship of the Aeronautical Society.

IT is understood that the Secretaryship of the Aeronautical Society of Great Britain is about to be vacant, and that the Council will be glad to hear from gentlemen with suitable qualifications who are willing to offer their services.

Edinburgh Aeronautical Society.

THERE will be a lantern lecture on "Aviation and its History" on Thursday, November 20th, at 8 p.m., at Dowell's Rooms, George St. G. S. Wilson in the chair. Admission to this lecture is free to the public.

The construction of a glider will be started on soon, and there will be a meeting on Tuesday, November 18th, at 6.15 p.m., at the Rutland Hotel, to make arrangements. Those who wish to take part should attend this meeting.

Death of Mr. A. E. Gaudron.

THE well-known pilot of balloons, Mr. A. E. Gaudron, passed away at his residence at Hampstead on Monday evening. His first long balloon voyage was from London to Sweden, a distance of 730 miles, and in 1908 he went from London to Russia, a distance of 1,117 miles, while in 1910 he made a balloon trip from London to Bavaria.

A Lifeboat to the Rescue.

WHILE making a flight from Sheerness to Harwich on Friday last week Lieut. Fowler was obliged to come down about 2½ miles from the shore off Walton-on-the-Naze, and the lifeboat put off to render assistance. Its aid was not required, however, and the pilot succeeded in taxying the machine ashore.

Mr. Hamel at Kidderminster.

SATURDAY week Mr. Hamel was flying on his Blériot machine at Kidderminster. He started from the Aggboro' football ground, and after making an exhibition flight flew over to Bridgnorth. He was to have landed there, but deemed the ground too small. He returned to Kidderminster just previous to halftime in the football match which was then in progress, and so had to go on and land at the Chester road cricket ground.

Mr. Prosser in a Snowstorm.

WHILE flying through the Cwmtaff Valley on his 50 h.p. Caudron biplane on the 7th inst., during a trip from Brecon to Merthyr, Mr. Edwin Prosser ran into a snowstorm about 4,000 ft. up. He lost his way in the clouds, but eventually reached his destination.

THE HANDLEY PAGE BIPLANE ON TRIAL.

THE new Handley Page biplane, equipped with a 100 h.p. Anzani engine, was flying for the first time during last week. On Wednesday, last week, Mr. Whitehouse did a few straights, and then a circuit on the machine on its first appearance, the machine climbing very fast and flying at a high speed. Mr. Meredith, the works manager, went up as passenger afterwards. Flying on Saturday was restricted by the race to Brighton, but on Sunday four passengers were carried, including Miss L. Bligh (from Canada), Mr. Whitehouse's brother, Mr. Hallem (of the Rolls-Royce Co.), and Dr. Reisner. The new machine flew with the steadiness characteristic of the 50 h.p. Handley Page monoplane, and banked gracefully on the turns.

The machine is designed on the same principles as the Handley Page monoplane, the planes being staggered, the top one being 18 ins. forward and fitted with *ailerons*. A Chauvière propeller, 8 ft. 6 ins. diameter, pitch 5 ft. 6 ins., is direct coupled to engine, the 100 h.p. Anzani. There is the ordinary control wheel for warp and elevator and a rudder bar for steering. There are two seats and the weight of the machine, with pilot and passenger, and 4 hours' petrol and oil, is 1,775 lbs., while the weight empty is 1,150 lbs.

The chassis is of the two-skid type, with a single axle and two wheels. Radius rods from the axle to the front struts keep it in position, and elastic cord acts as shock absorbing device.

This particular machine is designed for exhibition work, the requirements being very good climbing capacity so as to get out of small grounds, and slow landing speed.

It is built for an exhibition company in the North of England.

A few leading dimensions are :—

Span, top plane ...	40 ft.	Length over all ...	26 ft.
,, lower plane ...	32 ft.	Length of *fuselage* from engine plate to rudder post ...	20 ft.
Maximum chord ...	6 ft. 6 in.		
Gap	6 ft. 6 in.		
Area of top plane with *ailerons*	218 sq. ft.	Area of tail plane ...	32 sq. ft.
		Area of elevator flaps	19 ft.
Area of *ailerons*	28 sq. ft. each	Area of rudder ...	12½ sq. ft.
Area of lower plane...	166 ft.		

AERONAUTICAL SOCIETY OF GREAT BRITAIN.

Official Notices.

1. **Elections.**—Member: Lord Edward Grosvenor. Foreign Member: Enrique Sanchis.

2. **Council.**—Dr. T. E. Stanton and Dr. A. P. Thurston have been co-opted under Rule 14 to fill the vacancies on the Council caused by the retirement therefrom of Lieut. Gregory, R.N., and Major E. M. Maitland.

3. **Meetings.**—The first meeting of the Forty-ninth Session will be held on Wednesday, November 19th, at 8.30 p.m., when the Hon. Mr. Justice Atkin will preside. Mr. Roger Wallace, K.C., will read a paper, followed by a discussion on "The Right to Fly."

4. **Session 1913-14.**—The following programme has been arranged for the Session 1913-14, at the Royal United Service Institution, Whitehall, S.W., at 8.30 p.m. :—

November 19th.—"The Right to Fly." By Roger Wallace, K.C. The Hon. Mr. Justice Atkin in the chair.

Dec. 3rd.—"The Coming Airship." By Capt. C. M. Waterlow.

December 17th.—"Fast Flying as a Science." By C. T. Weyman. The Rt. Hon. the Lord Montagu of Beaulieu in the chair.

January 7th.—"Wind Gusts and the Structure of Aerial Disturbances." By Dr. W. N. Shaw, F.R.S., F.Ae.S. (The Royal Meteorological Society will be the guests of the Society on this occasion.)

January 21st.—"The Stability of Aeroplanes," illustrated by Experiments with Paper Gliders. By Leonard Bairstow, A.R.C.Sc. Sir Alfred Keogh, K.C.B., F.R.S., in the chair.

February 4th.—"Further Developments of Military Aviation." By Lieut.-Col. F. H. Sykes, A.F.Ae.S., Royal Flying Corps. Lord Sydenham in the chair.

February 18th.—"Aerial Navigation at Sea."

March 4th.—"The Rational Design of Aeroplanes." By Archibald R. Low, M.A., A.F.Ae.S. Mervyn O'Gorman, C.B., M.I.M.E., A.F.Ae.S., in the chair.

March 18th.—Annual General Meeting at 8, followed by "Lessons Accidents Have Taught." By Col. H. C. Holden, F.R.S., F.Ae.S. Maj.-Gen. R. M. Ruck, C.B., R.E. (retired), in the chair.

April 1st.—"Aeroplanes." By G. de Haviland.

April 15th.—"The Value of Ballooning as a Training for Flying." By Griffith Brewer, A.F.Ae.S., and Major E. M. Maitland, A.F.Ae.S., Royal Flying Corps. A. Mortimer Singer in the chair.

May 6th.—"The Calculation of Aeroplane Wing-Spar Stresses." By Harris Booth, B.A., A.F.Ae.S.

May 20th.—Wilbur Wright Memorial Lecture.

BERTRAM G. COOPER, Secretary.

Blackburns to Return to Filey.

HAVING secured control of the aerodrome at Filey, the Blackburn Aeroplane Co. purpose making it their experimental base. Dr. Christie is having a Blackburn waterplane built, and this will probably be stationed at Filey next summer with Mr. Harold Blackburn in charge.

A Bristol Waterplane at Pembroke.

THE experiments which have been conducted by the Bristol Co. with waterplanes at Milford Haven are now being continued at Pembroke Dock, with Mr. Busteed in charge. The machine—a biplane—on Friday last week made four flights towards St. Anne's Head, each time being up about a quarter of an hour and covering about sixteen miles.

CORRESPONDENCE.

Recording Air Flow.

[1808] With reference to the very ingenious apparatus described in your current number by Mr. Kerruish for recording air flow round solid bodies.

I have not had an opportunity to actually use such an apparatus, but considering the matter from a theoretical point of view, might I suggest that a true representation of the streamlines pass a solid body moving through air would not be obtained—the reasons for variance are twofold.

Firstly, the motion, whilst not precisely so, partakes largely of the nature of a two dimensional one, whilst in such a case as an aeroplane strut moving through the air, the problem is obviously three dimensional. The equations to the streamlines in the two cases are *not* identical.

Secondly, the flat plate on which the record is obtained would not be present in the actual case; in considering streamline functions, boundary conditions are of vital importance and have surprising effects, hence it is to be expected that the presence of this plate will materially alter the shape of the streamlines in its immediate vicinity.

If the apparatus is merely intended for demonstrating to the student the nature of streamline flow, these desiderata are of practically no importance, but if on the other hand it is intended for use in the design of struts for minimum resistance then, I submit, that these points of difference must necessarily have some material bearing on the results.

Royal Naval College, Greenwich. D. OFFORD.

Suggested Model Competitions.

[1809] I have often wondered why the K. and M.A.A. does not hold model aeroplane competitions on handicap lines. Such competitions have much to recommend them, and I think they could easily be arranged somewhat on the following lines :—

1st. That two competitions be held, one a scratch competition and the other a handicap competition, one entrance fee admitting to both.

2nd. That no person be allowed to compete in the handicap unless he has made a qualifying duration in the scratch competition.

3rd. That the same machine be used, and the prizes be identical in both competitions.

4th. That the competitions be open to any type of model aeroplane.

The handicaps could then be determined from the average duration in the scratch competition.

I am sure that such competitions would become very popular, and would attract a large number of entrants, and any extra expense would be covered by the entrance fees.

I shall be very pleased if any aeromodellist will criticise my views.

Thanking you for the assistance I have obtained from the model columns of FLIGHT.

Gunnersbury. A. M. BARROW.

FLIGHT

STABILITY IN FLYING MACHINES.

By ALBERT ADAMS MERRILL, Wellesley, Mass.*

FLYING differs from all other methods of transportation because of the fact that the stability of the machine is dependent upon its speed through the air. In this respect the bicycle is the only other machine used by man which resembles the flying machine. As at present designed, the flying machine has no inherent stability, and this is why flying is dangerous. It is the purpose of this paper to analyse the forces involved in flying in order to determine if, by changing the design of machines, it is possible to make flying safer.

2. For the sake of clearness it is necessary to define certain terms as they are used here:

Span is the distance from tip to tip at right angles to the path.

Chord is the distance from front to rear of a supporting surface.

Angle of incidence is the angle between the chord and the horizon.

Pressure angle is the angle between the chord and the path of the machine.

Vertical axis is a vertical line through the centre of gravity.

Longitudinal axis is a horizontal line through the centre of gravity at right angles to the span.

Lateral axis is a horizontal line through the centre of gravity parallel to the span.

3. Any motion of a flying machine can be resolved into two components: (*a*) a translation of the whole machine; and (*b*) a rotation of the machine about its centre of gravity. Since the former has no effect upon stability it will not be considered in this paper. Since there are three axes a rotation about the centre of gravity can be resolved into three components. I shall consider, first, rotations about the lateral axis, which are of two kinds: stalling and diving. The former occurs when the bow is raised; the latter, when the bow is depressed.

4. These rotations have a great influence upon safety in flight, not only because they throw the machine away from a safe horizontal position, but, particularly, because they affect the speed of the machine upon which control depends. Of the two, a stalling rotation is the more dangerous for two reasons: (*a*) because the pressure angle is increased, which increases the resistance, and, unless the thrust of the screw is increased proportionally, the speed is decreased. This is always dangerous, and many accidents have been due to stalling. (*b*) If the angular velocity of a stalling rotation is high, there will be a rapid increase of pressure per square foot on the supporting surfaces, and this sudden strain may cause the machine to collapse. Several deaths have been due to this cause.

5. Two effects may be produced by a diving rotation: (*a*) the speed is always increased, and the path is downward. These of themselves are not dangerous because increased speed means better control, and, provided there is sufficient altitude, the machine can be brought back to the horizontal before it strikes the earth. (*b*) If the angular velocity of the diving rotation is too high a *downward* pressure is produced upon the supporting surfaces which may cause their collapse downward. The explanation of this is as follows:—

6. In Fig. 1 AB is the chord of a surface moving to the right. Let AH be the horizon, let $\alpha = BAH =$ the pressure angle and also the angle of incidence, as we are assuming calm air. If the aviator moves the lever so that the angle of incidence is decreased and becomes $\alpha - \Delta\alpha$, the pressure angle also is decreased, hence the lift is decreased and the machine no longer maintains a horizontal course. Assume the new path to be AC and let the angle $CAH = \beta$. When $\alpha = \beta$ the new pressure angle becomes $\alpha - \Delta\alpha + \Delta\alpha = \alpha$ and the pressure is still upward. The danger in a diving rotation depends upon the fact that the maximum value of β per unit time is fixed for a machine of a given weight and speed, so that if, in that time, $\Delta\alpha > \alpha + \beta$, the condition

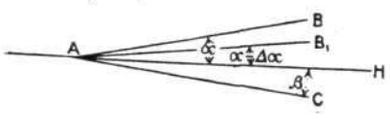


Fig. 1.

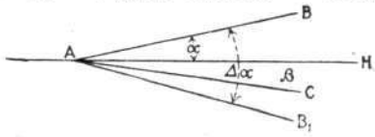


Fig. 2.

Fig. 1.—Diagram showing how the angle of incidence can be reduced without altering the pressure angle.

Fig. 2.—Diagram showing that when the angle of incidence is reduced too quickly the pressure angle becomes negative and the air strikes on top of the surface.

shown in Fig. 2, where AC is the path, is obtained and the pressure is downward.

7. Too rapid a diving rotation has caused the downward collapse of machines and the deaths of some aviators.

* A paper read before the American Society of Mechanical Engineers, New York

8. The rotations described above are caused by the movement of the horizontal rudder, and it is evident that the angular velocity of these rotations will determine the magnitude of the danger which follows.

9. I have shown that, by moving the horizontal rudder at the proper speed, it is possible to reduce the angle of incidence without altering the pressure angle. This is safe because with a constant pressure angle there can be no sudden change in the pressure per square foot. I have thus far assumed that there is no wind, or that the wind is steady and horizontal. As a matter of fact this condition rarely exists, and it is necessary to consider the problem when flying in a natural wind. Any change in the direction of the natural wind alters the value of the pressure angle, and the position of the point of application of the resultant pressure upon a supporting surface is a function of the pressure angle. With any curved surface, such as is always used in flying, when the pressure angle is decreased from 90° to about 15° the centre of pressure moves forward, but from 15° to 0° it moves backward. This phenomenon is called the reversal of the centre of pressure, and it makes the flying machine, as at present designed, inherently unstable. A graphical representation of the movement of the centre of pressure on a curved surface is shown in Fig. 3. In Figs. 3 and 6, *a* represents upward and *b* downward pressure.

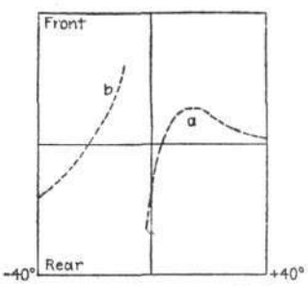


Fig. 3.—Diagram of the movement of the centre of pressure upon a curved surface showing that as the pressure angle increases from 0 degrees to 15 degrees, the centre of pressure moves forward, which produces an upsetting couple.

10. At all flying angles (+ 3° to + 10°) the centre of pressure moves forward as the pressure angle increases. Let us see what effect this has on stability:

11. In Fig. 4, let AB represent a surface held against a wind, AC; then $BAC =$ the pressure angle. Let the point O represent the centre of pressure and the centre of gravity. Suppose the wind to change to the position AD, then it is evident the pressure angle has been increased by the amount CAD. Let $BAC = 5°$ and $CAD = 3°$, then the new pressure angle will be 8°. Fig. 3 shows that when the pressure angle increases from 3° to 8°, the centre of pressures moves forward. Let the new centre of pressure be at S. This produces a couple tending to cause a stalling rotation, and is just the reverse of what is desired, because, if any rotation takes place about the lateral axis, and some rotation is bound to take place when the wind changes its direction, that rotation should be such as to keep the pressure angle constant, which

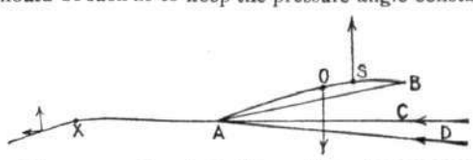


Fig. 4.—Diagram showing how the dangerous stalling couple is offset by the horizontal rudder.

is generally the important thing in flying. Therefore, it is evident that the couple shown in Fig. 4 is an upsetting couple, and that safety requires that it should be offset by some other couple. As a matter of fact this other couple is introduced by the horizontal rudder shown at X, but the point to note is that this couple must be introduced by the pilot, and that the machine, of itself, has no stability. I consider this to be a fundamental error in the design of all flying machines, which must be remedied if there is to be any large future for the art.

12. All naval architects know that when a boat tips to the left the centre of buoyancy must move to the left in order that the metacentre shall be above the centre of gravity. Now, referring to Fig. 4, it will be seen that the change from AC to AD is equivalent to a contra-clockwise rotation about the centre of gravity (that is, to the left), letting AC remain stationary, yet the centre of pressure moves to the right. The offsetting of this false couple with the horizontal rudder would find its analogy in naval architecture if, when a boat tips to the left, it were necessary to use a pontoon on the left side to keep it from turning over. If such a construction were necessary with boats, their use would be very much restricted; yet just such a construction is necessary with the present type of

flying machine. That we fly as well as we do is not due to the design of the machine, but to the skill of the pilot.

13. So far as longitudinal stability is concerned, the most superficial study of the subject should teach that a machine must be designed so that when the pressure angle increases, the centre of pressure will move backward constantly through all angles from 0° to 90°. Let us see if we can solve the problem theoretically:

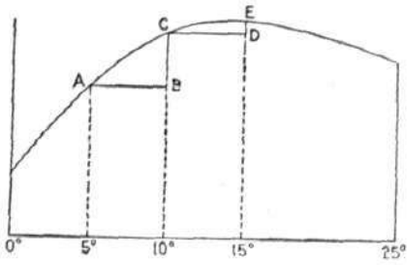


Fig. 5.—Diagram of the lift graph of a curved surface showing that the value of a tangent to the graph decreases as the pressure angle increases.

14. Fig. 5 represents the lift graph of a curved surface, and in its fundamental characteristics it is typical of all lift graphs. The abscissae represents the pressure angles and the ordinates represent the lift. A glance shows the important fact that the value of the tangent to the curve decreases as the angle increases. From 5° to 10° the increased lift is BC, while from 10° to 15° it is only DE. Therefore if one surface is placed behind another in a position such that the pressure angle of the front surface is always greater than that of the rear surface, then, when the angle of the *system* is increased, the centre of pressure will move back as it should and we shall have a righting couple. Such a system, known as the converging tandem system, has been tested in the laboratory of M. Eiffel, and the graph of the movement of its centre of pressure is shown in Fig. 6.

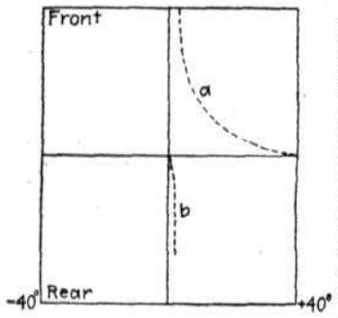


Fig. 6.—Diagram of the movement of the centre of pressure on a converging tandem system, showing that the couple introduced is a righting couple.

15. Note that, at small angles, the pressure jumps back to the rear edge, but it is downward, so it still produces a righting couple. The method of testing for the centre of pressure consists simply in setting the surface with its span vertical on a vertical axis in a current of air, and noting the pressure angle for each particular position of the axis relative to the front edge. With the ordinary curved surface, designed as monoplane or biplane, it is impossible to obtain stability at flying angles, whereas, with the converging tandem, the system can be moved away in either direction, and, when free, will return to its original position under the influence of the air. In fact it acts exactly as does a weathervane. I have tested this in speeds up to 120 miles per hour. This system, then, so far as laboratory tests show, has inherent longitudinal stability, and its practical value is supported to some extent by the fact that all the long flights with models (over 2,700 ft.) are made with it. At the time of writing, it has not been given a thorough test with a full-sized machine so far as I know. It must not be confused with the tandem system Langley used. In this the pressure angles of the two surfaces were equal, hence it could not have longitudinal stability, as a study of Fig. 5 will prove.

16. Considering the question of the tandem further, with the present type of machine the false movement of the centre of pressure necessitates an offsetting couple (produced by the horizontal rudder), and it follows that the machine must be sensitive to the rudder, hence its moment inertia about the lateral axis must not be above a certain limit. This means, however, that, if the machine is sensitive to the rudder, it is also sensitive to gusts. On the other hand, by the very nature of its structure, the tandem will always have a larger moment inertia about the lateral axis than a monoplane or biplane of equal area and weight; hence it will not be as sensitive to its rudder, neither will it be as sensitive to gusts. Criticism has been made of the large moment inertia of the tandem, but I fail to see why this characteristic is a dangerous one, since a righting couple is always introduced when the machine is disturbed. It is evident that the course of a tandem cannot be changed as quickly as that of a monoplane, but that is a point in its favour, not against it. The course of a touring car cannot be changed as quickly as that of a bicycle, yet no one claims that a bicycle is safer than a touring car.

17. There is another point in favour of the tandem. As air leaves the rear of a surface it is moving downward. This constitutes the slip stream of the surface. Somewhere back of the surface the air rises, seeking its normal position. It is possible that a position may be found in the wake where a surface can be placed to great advantage. At the present time, with monoplanes and biplanes, all the energy delivered to the air by the front surface is wasted. It is evident that few naval architects have studied aeronautics, else more thought would have been given to using this wake. The tandem offers a chance to utilise this wake.

Lateral Stability.

18. Lateral stability has to do with rotations about the longitudinal axis. The resultant pressure on a surface is a function of two independent variables. The pressure varies as the square of the speed and as less than the first power of the pressure angle. It is evident therefore that a change of speed has more effect on pressure than a change of angle. The relation of the pressure to the speed is constant for all kinds of surfaces, but its relation to the angle depends upon the shape of a cross-section of the surface used.

19. I will consider first the forces involved in producing a rotation about the longitudinal axis when flying in calm air, which is called a banking rotation. Suppose a machine to be flying straight and the vertical rudder is turned. This causes a rotation about the vertical axis and makes the tip speeds unequal. The change of tip speeds produces a change of pressures and causes a banking rotation. The machine banks in the same direction it turns; thus, if the rudder is set for a left turn the right wing moves faster than the left wing, the former rises and the latter falls so that the machine banks to the left. This is as it should be. If we had assumed in the first place that the machine was off its balance laterally, then a turn towards the high side, by retarding the high wing and accelerating the low wing, will bring the machine back to the horizontal position.

20. As in all other phenomena connected with flight the time element is a factor which determines the nature of the result which follows the use of the rudder. In a machine in which the moment inertia about the longitudinal axis is greater than the moment inertia about the vertical axis, too quick a rotation about the vertical axis will spin the machine without giving it time to bank, and skidding will result, since without a bank the direction of the path of a machine cannot be changed. On the other hand, the proper angular velocity of rotation about the vertical axis will produce the proper bank for the turn it is desired to make. The vertical rudder therefore plays an important part in all rotations about the longitudinal axis.

21. However there are other means for producing banking rotations. The one most commonly used was first reduced to practice by the Wright Brothers, and it consists of warping the supporting surface in a manner such that the pressure angles at the tips are unequal, the larger angle being at the tip which must be raised. Practically all machines flying to-day use this system, either as the Wrights use it or in a modified form. Practically all machines increase the pressure angle of the tip which must be raised. If the supporting surface is not warped, auxiliary surfaces called *ailerons* are used to produce substantially the same result. While machines using this system fly, and fly well in the hands of good pilots, there is a fundamental error in this system which increases the danger of flying. Since the pressure varies as the square of the speed, it is evident that to change the angle of a tip, which must be raised, in such a way as to reduce its speed will produce a result the opposite of what is desired unless some offset is introduced. When the pressure angle, say, of the right tip is increased, the the resistance offered by that tip is increased, and its speed decreased, hence the machine starts to turn to the right and a banking couple to the right is produced. However, this is just the reverse of what

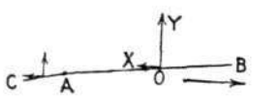


Fig. 7.

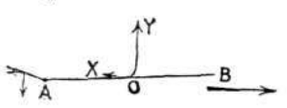


Fig. 8.

Fig. 7.—Force diagram of a surface and an *aileron* set at a positive angle showing that the *H* and *V* components produce opposite effects.

Fig. 8.—Force diagram of a surface and an *aileron* set at a negative angle showing that the *H* and *V* components co-operate to produce similar effects.

is wanted, because increasing the pressure angle was for the purpose of raising the right tip, while a banking rotation to the right will

lower that tip. It is at this point that the rudder comes into play as an offset. The rudder is turned so as to prevent any rotation about the vertical axis and hence keeps the tip speeds equal, then the difference in the pressure angles produces a banking rotation to the left, which is what is wanted. With lateral stability as with longitudinal stability flying machines are designed so badly that a dangerous couple which should not exist has to be offset with another couple controlled by the pilot. The horizontal rudder has to be used to prevent stalling and the vertical rudder has to be used to prevent the disastrous effect of the warp alone. In the Wright machine, but only in the Wright, there is a mechanical connection between rudder and warp which relieves the strain on the pilot somewhat, nevertheless the design is radically wrong because it introduces a force which is not only useless, but which is positively dangerous. It is a very simple matter to design a system in which all the forces introduced can be used, and Figs. 7 and 8 will explain how this can be done.

22. In Fig. 7 let AB represent a surface moving in the direction of the arrow, and let OY and OX be respectively the V and H components of the pressure upon it. Suppose it is desired to raise this surface, and for this purpose an *aileron*, which hitherto has been out of action, is moved down to the position AC. The component pressures on this are represented by the arrows. It is evident that if the speed is kept constant the surface will rise, but as the H component of the system is increased, the speed will decrease, and instead of rising the surface may fall. The problem can be worked out as follows: Compute the horse-power necessary to support the surface alone with a given pressure angle and speed, the weight of the surface being known. This horse-power is to be constant. Move the *aileron* down to a certain angle and compute the horse-power necessary to support both surface and *aileron* at the original speed. If the *aileron* is given a positive angle, which must be done if the surface is to be raised, it will be found that more horse-power is needed; but we have assumed the horse-power to be constant, therefore it is evident the speed of the system must decrease. Since, when there is no change in the angle, horse-power varies as the cube of the speed, it is an easy matter to compute the new speed. Knowing the new speed and the pressure angles of the surface and *aileron* the new lift of the system can be found.

23. These computations are based upon coefficients determined in a laboratory. With Eiffel's coefficients I can show that if the power remains constant and the pressure angle increases, for the first 2° or 3° there is a slight increase of lift, afterwards the lift drops rapidly. This is what I call the fallacy of the positive angle. Within the last six months foreign students are beginning to understand it, and as able an expert as Cap^t. Duchene has written upon the subject. He says:

"It would seem that in aeroplane construction designers have refused to employ anything but controls acting *differentially*; that is, every time one particular organ of control had to fulfil a definite function it has been so designed, with the greatest ingenuity, as to fulfil precisely the opposite function as well. Sometimes even—and especially with the warp on large-span machine—this opposite effect preponderates and must be overcome by bringing another organ into play. But in any case, the differential action of the controlling organ compels the designer to make its dimensions unnecessarily large.

"Whether with warp or *ailerons*, the effect aimed at is to raise one wing-tip by increasing its lift, and to lower the other wing-tip by decreasing its lift.

"But if we inspect Eiffel's curves for lift or drift we see that for every increase in the angle of incidence, though the lift may increase (which is the effect aimed at by warping), the drift also increases, which is a parasitical effect, for the ensuing drag on the raised wing-tip tends to produce a turning movement in the opposite direction to that which should follow on the inclination of the wing produced by altering the lift on the wing-tips.

"The warp therefore acts differentially, so that in large-span machines where the drag is considerable, its detrimental effect has to be counter-balanced by an opposite effect obtained through the use of the rudder.

"The necessity for operating the warp in conjunction with the rudder therefore only results from a defect in the method of warping which, as known at present, is a barbarous method." *

24. The question now is what can we substitute for the positive angle? From Fig. 7 it is seen that an upward V component and a backward H component must always antagonise each other. As the H component must always be backward suppose a downward V component is used. Instead of pulling an *aileron down*, suppose it is pulled *up* on the opposite tip, *i.e.*, on the tip that is to be lowered.

25. Fig. 8 shows what will happen: The V component of the *aileron* is downward and the increased H component of the system, by retarding the tip, also lowers it. The components work in harmony and no offset is needed. Can anything be simpler or safer?

26. I have shown that the converging tandem should produce inherent longitudinal stability. Any disturbance about the lateral axis will introduce a righting couple which will set up oscillations, which will gradually die out. The magnitude and periodicity of these oscillations will depend upon the strength and direction of the gust, the moments of the pressure on the surfaces about the centre of gravity and the moment inertia of the whole machine about the lateral axis. One important feature about these oscillations is their effect upon the lift of the surfaces. As the bow rises the lift will increase, and as the bow falls the lift will decrease. This will result in an undulating flight without, however, materially altering the altitude.

27. In calm air it is possible to obtain inherent lateral stability by what is called a dihedral angle. If a line joining the tips of a surface passes above the centre of the surface, the surface is said to have a dihedral angle. If such a surface is rotated about its longitudinal axis, one side of it will become horizontal, and the other will move away from the horizontal, hence the difference in the V components on the two sides will cause the surface to move back to its original position through a series of oscillations. But these oscillations differ from those about the lateral axis since at no stage of these oscillations is the lift greater than it was when flying horizontally, while at some stages the lift is very much less, hence such oscillations will cause a great loss of altitude. Of course these oscillations are damped out in time, and so a dihedral angle will prevent a machine from turning over, but this does not mean that to depend upon a dihedral angle is safe. Less than 1 per cent. of aviation deaths are due to overturning. The largest number of deaths are due to striking the earth at too high a speed with the machine at such an angle that it does not strike *first* on its landing gear. Assuming a loss of manual control in a machine having a dihedral angle, there is the highest probability that when the machine finally strikes the ground it will not land on its wheels, and to land in any other way means a smash, and possible death to the pilot. Unless they have made a careful study of this subject, few people realise that, for safety in landing, it is necessary not only that the machine should be right side up, but that its longitudinal and lateral axis should be within at least 2° or 3° of the horizontal. The dihedral angle alone will never be able to guarantee this condition of safety.

28. Owing to the fact that any system of inherent stability must set up a series of oscillations, and as oscillations about the longitudinal axis always mean a loss of altitude, which is a very dangerous thing, it appears to be impossible to obtain a safe system of inherent lateral stability. Certainly, the chances of finding it are less than they are of finding a safe system of inherent longitudinal stability. The converging tandem offers a possible solution of the problem of inherent longitudinal stability, because no matter how long the machine oscillates under the combined action of the gust and the righting couple, there is no danger of its losing altitude, as there always is from oscillations about the longitudinal axis.

29. There is another kind of stability, however, which offers a chance of making flying safer. This is automatic stability. If a mechanism could be invented which would move the control levers in the proper way and at the proper time, the pilot would be relieved of much strain and flying would be made safer. Since stability is wholly unrelated to translations of the machine and connected only with rotations about one or more axes, it follows that the control mechanism must be sensitive to rotations but not sensitive to translations. This eliminates the pendulum as a possibility. Contrary to belief the pendulum is unsuited for this purpose, because a translation of its point of support sets up oscillations which are not wanted. Mercury cups or other moving fluids are also unsuited for the same reason—*i.e.*, they are sensitive to translations of the machine. The gyroscope is unsuited because it tends to maintain a fixed plane, whereas in practical flying the longitudinal and lateral axis must often take different planes at different times. Moreover, there is one characteristic of the gyroscope which is very bad. It cannot act except it is revolving. It is dangerous to depend for stability upon a mechanism which has to be in motion.

30. This summer at Chicago I examined a mechanism, the details of which I am not at liberty to disclose, which appears to be able to guide a flying machine independently of manual control. It is sensitive to rotations but not to translation, the couple introduced is a static couple, the force employed cannot fail to act, and the distributing mechanism is so simple it is hard to see how it can get out of order. To move the levers, power is taken from the engine, the mechanism simply controlling how far and when the levers shall be moved. The system is auxiliary to manual control, and can be cut out whenever the pilot so desires.

31. Inherent stability for flying machines is hard to obtain. The problem is different from that of a boat, because a boat is immersed in two fluids of different densities, while a flying machine is immersed

* "Aeronautics" (English), July, 1913.

in one fluid. There is no reason, however, why stability cannot be greater than it is in existing machines; two fundamental errors in design should be changed now, namely, the use of the horizontal rudder to prevent stalling and the use of the vertical rudder as an offset to the warp.

For some years I have been convinced that these offsets are evidences of bad design, and apparently other students are coming around to my opinion.

32. It is twenty-two years since Langley published his valuable work on plane surfaces, yet although the Wrights were the first to fly, no research work worthy of the name has been done in this country, and the only scientific progess the world has made had its start in Eiffel's laboratory researches.

33. I hope that this paper will awaken an interest in the theory of aeronautics to the end that engineers will give some of their time, and, where able, some of their money, to any proposition which will put aeronautics upon a firm foundation in this country. It is to be regretted that, although aviation had its start here through the work of Langley, Chanute and the Wright Brothers, we are at the present time far behind France so far as real scientific progress is concerned.

34. What is necessary is several well-equipped laboratories and able men who can devote all their time to research work. Before aviation is placed upon a firm foundation a correct theory of design must be worked out, and this can be accomplished only by thorough research work in the laboratory.

FOREIGN AVIATION NEWS.

New Records Passed.

AT a meeting last week the Commission Sportive Aeronautique accorded official recognition to the record of 6 h. 42 m. 49⅘ s. for pilot and passenger made in a closed circuit at Deauville by Gaubert on Aug. 30th. They also passed Prevost's speed records which were made at Rheims on Sept. 27th, together with the records which superseded them on Sept. 29th. The latter are from 10 to 200 kiloms. and from ¼ to 2 hours.

Brindejonc Secures Pommery Cup.

THE C.S.A. also decided that Brindejonc des Moulinais was the winner of the Pommery Cup by his flight on a Morane-Saulnier monoplane from Villacoublay to Warsaw, 1,382 kiloms.

Mme. Pallier's Fine Flight.

BY her flight of 290 kiloms. in 3 hrs. 40 mins., on an Astra-Nieuport biplane, on Monday, at Mourmelon, Mme. Pallier has secured first place in the competition for the Coupe Femina, having beaten Mdlle. Dutrieu's record of 254·130 kiloms. Mme. Pallier made 29 circuits of the 10 kilom. course, but there appears to be some doubt as to whether the first lap will count as the official timekeeper was not present at the start.

Rost after Height Honours.

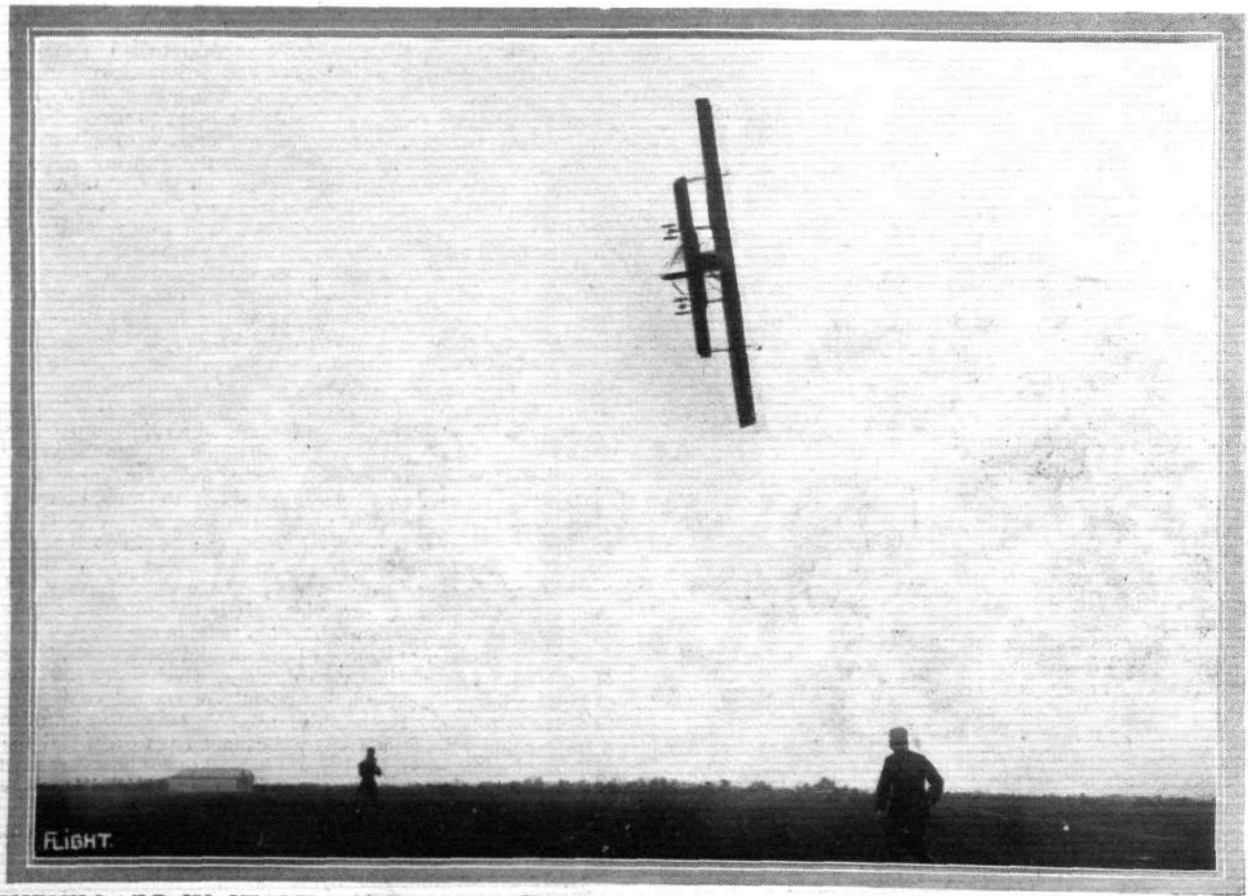
AT Etampes, on Monday, Rost on his Deperdussin monoplane made an attack on Perreyon's world's height record of 5,980 metres. He climbed to 4,950 metres and then gave up the attempt. He will, however, have another try at the earliest opportunity.

Guillaux Suspended for Ten Years.

AT a fully attended meeting of the Commission Sportive Aeronautique on Friday, the case of the mistake which arose in connection with Guillaux's last flight for the Coupe Pommery was considered at length. Guillaux took full responsibility for the error and expressed his regret. It was eventually decided that he should be suspended for ten years.

Helen's Try for the Michelin Cup.

ANOTHER matter considered at this meeting of the C.S.A. was the stop made by Helen on the 28th inst., and it was decided that as he rolled for part of one of the circuits on that day, that disqualified him from proceeding further. As a precaution, Helen made another entry on the 31st ult., and the C.S.A. decided that his score should count from that date. He, therefore, loses the credit of the 4,797 kiloms. which he had flown between the 22nd and the 30th October. According to the new mode of reckoning, he had covered 5,330 kiloms. up to Sunday, and in order to beat Fourny's record he will have to fly 533 kiloms. a day up to the 28th inst.



CHEVILLARD IN ITALY.—At Pordenone, Chevillard repeated his wonderful banking exhibitions on the Henry Farman, and the above sample of his work there, with Mr. Santoni as a passenger, has been sent us from Italy.

New President of the C.S.A.

ALSO at this meeting of the C.S.A. the resignation of the chairman, Count de la Vaulx, was received, and M. Soreau, a vice-President of the Aero Club of France, was elected by a large majority to fill the vacancy.

Chevilliard's Latest Performance.

ON Thursday, last week, at Buc, and at Juvisy on Sunday, Chevilliard gave demonstrations of the latest development of his *chute de côté*, which was seen at Hendon some time ago. In this latest exploit, the movements, as in Pegoud's flights, are made so quickly that it is by no means easy to follow them, but it seems that Chevilliard takes the machine up, and makes a left-hand turn, following this up by banking the machine until the planes are vertical. He then dives as in his old manœuvre, but instead of flattening out he apparently continues the bank, so that the machine is diving nose down with the right wing tip now *inside*—although it is still uppermost—the machine still continuing the spiral; in other words, it is diving upside down. The next move is to correct the dive by flattening out, while still following a spiral path, and eventually the machine regains its normal flying position.

At Buc Chevilliard used one of the ordinary Henry Farman biplanes, fitted with an 80 h.p. Gnome motor, and during the time he was in the air a veritable gale was blowing. For the performance at Juvisy on Sunday, which included three demonstrations at intervals of an hour, the machine used was a special one built for an attempt on the Michelin Cup; it has a 9-cyl. Rhone motor. During Sunday afternoon exhibition flights were also given at Juvisy by Champel on his own machine, Vallier on a Caudron and Lanier on a Deperdussin, these three machines each having Anzani motors.

Flying from the Hague to Etampes.

STARTING from Wassenair near the Hague on Saturday morning, Van Steyn intended to fly to Etampes on his H. Farman biplane with a passenger. It may be remembered that he made the journey in the reverse direction some weeks ago. On Saturday, after flying for two hours and a-half and covering about 100 miles, he was obliged to land on account of the wind at Assenede on the Belgian frontier. Restarting later in the day, he had to make another descent, after half an-hour's flying, at the St. Denis plains near Ghent.

Farman Brothers Flying in Company.

ON Sunday week Maurice Farman, with a lady passenger, went over to Etampes from Buc on one of the latest model machines of his design, and during the return trip he flew in company with Dick Farman, who was piloting one of this year's type M. Farmans.

French Aerial Mail Postponed.

OWING to the railway disaster at Mélun the French Minister of Commerce decided to postpone the experimental aerial mail service from Paris to Nice, which was to have been carried out on the 7th inst. by Martinet. Arrangements are, however, being made for the experiment to be carried out shortly; and on Monday Martinet, who is to be pilot, made a test flight, on the Doutre biplane which he will use, from Compiegne to Nevers.

The Duc de Montpensier over Bordeaux.

ON Sunday afternoon the Duc de Montpensier enjoyed a sight of Bordeaux from aloft, being taken for a trip above the city on a hydro-aeroplane piloted by Issartier.

The Misfortunes of Galtier.

AFTER being detained by the police at Dunkerque for having flown over a prohibited area, as recorded in last week's FLIGHT, Galtier was accorded permission to leave the district, but not by way of the air, on the 5th inst. As a matter of fact, he was in further trouble with the police because he made a trial flight for the purpose of testing his engine.

The Prince Henry Circuit.

THE arrangements made for the Prince Henry Circuit are that the competitors from May 16th to 19th must fly from Darmstadt by way of Pfarzheim, Strasburg and Mannheim to Frankfort, and then make a circuit *via* Mayence, Bingen, Coblentz, Bonn, Cologne and back to Frankfort. From May 20th to 22nd they will go by Cassel and Brunswick to Hamburg and make another circuit *via* Hanover, Minden, Munster and Psuabrueck. On the 22nd there will be a reconnoitring flight to Cologne, while there will be further military exercises at Cologne on the 25th inst.

Military Pilots in Switzerland.

THE Swiss military authorities have decided not to accept married men as officers of the flying corps. In consequence of this decision the Swiss army will lose the services of Taddeoli, Schumacher and Burri.

Pegoud at Brussels.

ON Saturday and Sunday Pegoud gave exhibition flights at the Berchen aerodrome at Brussels, and although it rained heavily he carried out his usual programme of "s" dives, corkscrew twists, looping the loop and upside down flying. During Saturday's exhibition he looped the loop five times in succession. On the 16th and 17th inst., Pegoud will give a demonstration of his flying at Frankfort.

Flying to Odessa.

LAST Saturday Marc Bonnier left Villacoublay on his Nieuport monoplane in an attempt to fly to Vienna and Odessa. On account of the bad weather he had to stop after covering but a short distance, and then returned to Villacoublay. He started again on Monday, and reaching Nancy by midday, left during the afternoon for Stuttgart.

A Russo-German Frontier Incident.

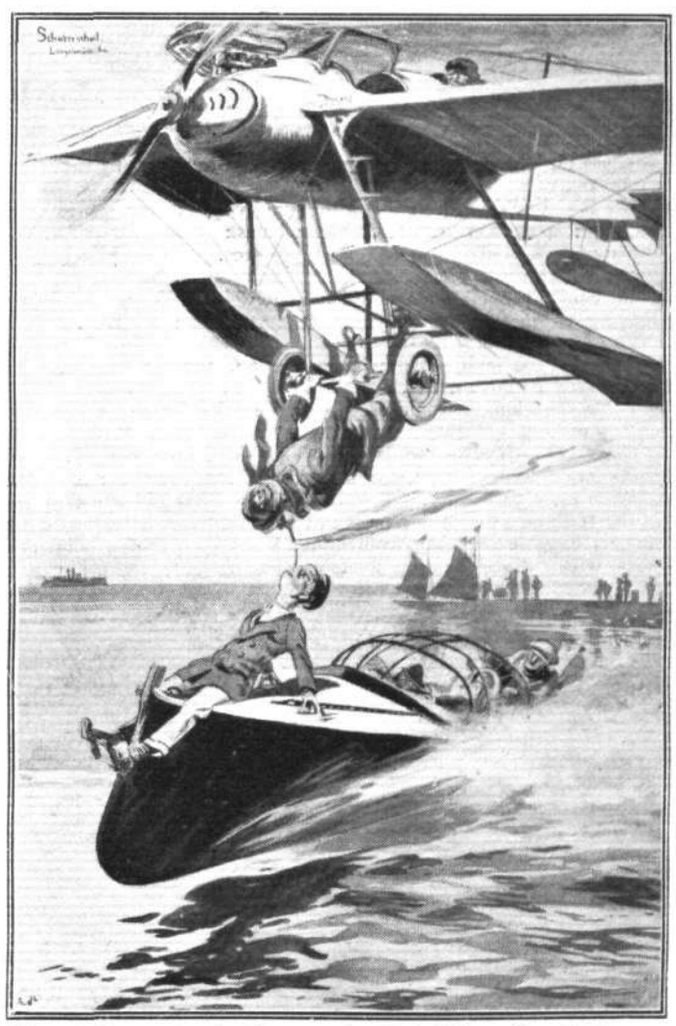
ON the 4th inst. an officer stationed at Posen unfortunately, in the misty weather, crossed the Russian frontier. On being fired at by the frontier guards, he descended and was told that he would have to go to Slupce in order that investigations might be made. Instead of going by rail, he offered to fly there accompanied by a Russian officer, but the machine was carried by the wind across the frontier and landed again in Germany at Konikowo near Guesen.

Another Japanese School.

FROM Tokio it is announced that Baron Shigeno is proposing to start an aviation school at Osaka, and to equip it with machines purchased in France.

The New German Military Zeppelin.

THE twenty-first Zeppelin to be built is to be inflated to-day (Saturday), and will undergo her trials next week. On being taken over by the German Army authorities she will be renumbered "Z 6."



Mutual Courtesies by Sportsmen of the Next Generation.—"May I trespass on you for a light?"—From the German *Motor*.

Models

Edited by V. E. JOHNSON, M.A.

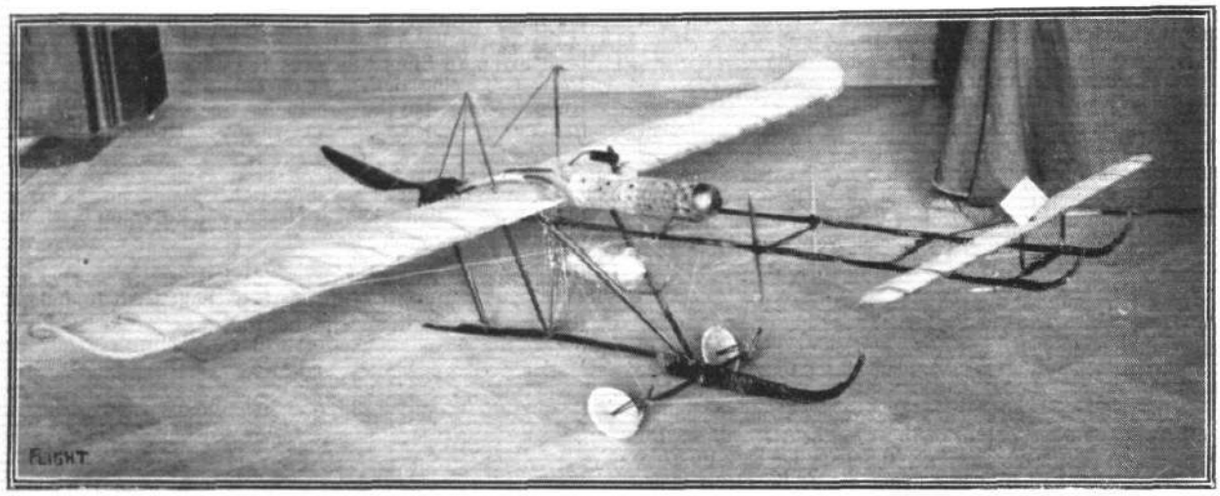
The Coming Show at Olympia. Over £60 in Prizes.

THE model competitions and regulations thereof which are to be one of the features of the Royal Aero Show at Olympia in March next are as follows :—

Class I.—Power-driven models (excluding rubber and spring motors). Minimum or qualifying duration of flight : Half-a-minute. Marks : 50 for design and construction, 50 for stability, plus actual number of seconds flown, *i.e.*, 1 mark per sec. ; presuming them of course to be more than 30. First prize, £10 ; second, £5.

Class IV.—Model aero motor (excluding rubber or spring motors). The weight of the motor inclusive of all accessories with fuel for a minimum run of two minutes (to be taken on a bench test) not to exceed 10 lbs. The motors will be judged as before on a weight per h.p. basis. Prize, £5.

Class V.—Single-screw tractor models. Rising off ground. Minimum weight : 6 oz. Minimum loading as in Classes II, III and IV. Qualifying duration of flight : 30 secs. First prize, £3 ; second, £2 ; third, £1. Marks as in Class II.



Mr. H. H. Groves' *Model Engineer* power-driven model, flash boiler pump feed power plant.

Class II.—Models driven by any other power, *i.e.*, by rubber or springs.

(*a*) Rising off the ground. Minimum weight : 8 oz. Minimum loading : 4 oz. per sq. ft. for monoplanes ; 3 ozs. per sq. ft. for biplanes. Qualifying duration : 30 secs. First prize, £5 ; second, £3 ; third, £1.

(*b*) Single propeller r.o.g. Minimum weight : 6 oz. Minimum loading as in (*a*). Qualifying flight duration : 20 secs. First prize, £2 ; second, £1.

Marks : 100 for design and construction, 100 for stability, plus actual seconds flown ; *i.e.*, if a model makes 3 flights of 100 secs. *average* duration it would receive 100 marks for the flying tests and so on.

Class III.—Hydro-aeroplane models. Minimum weight : 8 oz. Minimum loading as in Class II. Qualifying duration : 20 secs. First prize, £5 ; second, £2. Marks as in Class II, save that out of the 100 given for design and construction 25 will be awarded for models capable of rising from and alighting on *both* ground and water without interchanging floats or wheels.

Class VI.—Weight-carrying models. Minimum weight of model *alone*, 16 oz. No maximum. Each model to carry ¼ its own weight. First prize, £4 ; second prize, £2.

Class VII.—Ornithopter models. Minimum duration : 15 secs. Prize, £10.

And, *perhaps*, one more class for inventor's ideas, as applicable to full-sized work.

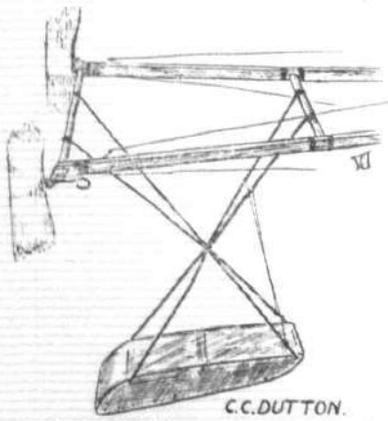
In Classes II, III, V, and VI the duration marks will be awarded on the *average* of the aggregate number of marks awarded in the three flights.

Any competitor who may be unable to attend the flying tests will be allowed to appoint a substitute or deputy to fly it for him.

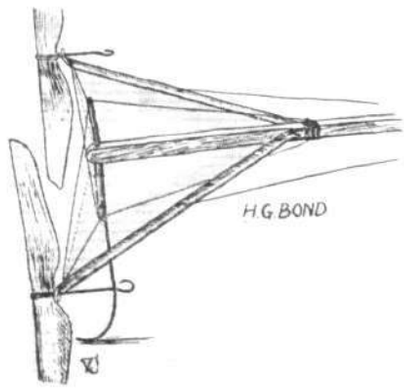
Special team prizes will also be awarded to the affiliated club making the best aggregate of marks in Classes II and III.

It will be seen from the above that the competitions, from a scientific point of view, show a considerable advance on those of last year, and they certainly should result in a first-class exhibition.

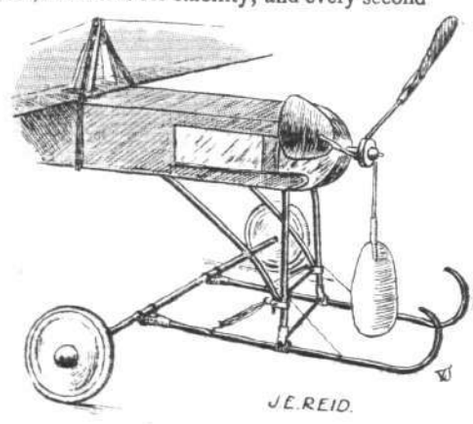
Had the suggestion which was put forward of having low marks for design and construction, no marks for stability, and every second



Mr. C. C. Dutton's method of rear float attachment—a neat and skilful piece of work from the *Model Engineer* Exhibition.



Mr. H. G. Bond's very neat and efficient method of tail construction, from the *Model Engineer* Exhibition.



An interesting piece of steel and rubber sprung chassis work by Mr. J. E. Reid at the *Model Engineer* Exhibition.

of flight to count as a mark been carried out, then the exhibits in all probability would have consisted of the finest collection of "flying-sticks" yet exhibited. With the result—that the visitors could not have failed to note the *dis*-similarity between them and the full-sized machines on exhibition side by side, and would have undoubtedly regarded them merely as an exhibition of flying toys. As it is, with 100 marks for design and construction and 100 for stability, competitors will be compelled to pay due regard to the true *model*-like character of their machines. This does not mean that they need be in any way elaborate constructions or attempts at scale models or part scale models of full-sized machines; but it does mean that *some* regard must be paid to the relative proportions which exist in full-sized work. We think it is now a fairly open secret that the machine which gained the most marks for design and construction at the last Olympia Show was a single-screw tractor plane exhibited by Mr. Dollittle. There was then no separate class for tractors. The machine was not submitted to the flying test. Now, if we remember correctly, this machine was of quite simple construction. Undoubtedly the design and construction of the chassis is one of the chief points in a model.

The restriction as to minimum loading is, we think, an excellent regulation, and was much needed; and although there are, we know, those who would have liked to see a greater minimum of 6 or 8 oz., we think that 4 oz. forms an excellent basis to commence on.

That the *average* results of the three flights should be considered, and not the single best one, is a point which the writer has urged for years. He has seen so many instances at different times in which one more or less "fluky" or tricky flight has carried off the prize. Moreover such a regulation encourages *reliability*, which is one of the most important items in model work as in everything else. It has always appeared to the writer absurd that a competitor who made three flights, say, of 0, 15, and 39 secs. should take the prize against three flights of 35, 34, and 37 secs. respectively. The first competitor's average is 18, and the second's 35. There are of course certain objections which can be brought forward against this system as against any other; but on the whole we think it far the preferable of the two.

The question of *stability* is naturally still one of *the* questions in aviation as it always has been, and it is only right that especial stress should be laid on it. There is, of course, the eternal question What *is* stability? just as there is the everlasting question of the best type of propeller. Stability in the K. and M.A.A.'s regulations is, we believe, defined as "evenness of path of flight," which would appear to be but another name for "steadiness in flight," akin to "stiff" as opposed to "rolling stability."

The main factor in all questions appertaining to stability is that any oscillations set up must be (in the case of a model) automatically damped out, and the quicker and more effective the damping the greater the stability. As we have so often pointed out in these columns, "speed" must ever remain one of the chief factors in determining steadiness in flight.

The argument put forward, we believe, by those who desired to eliminate any special marking for stability was that the model making the longest duration was "naturally" the most stable. Now, whereas it is doubtless quite true that no really *unstable* model can put up a good duration, it by no means follows that the machine making the longest duration is the most stable. We have personally seen some very long duration flights, which at times showed a truly remarkable lack of stability. There is a vast difference between merely "keeping aloft" for, say, 100 secs. and making a really good flight of the same duration. We have, of course, seen flights which were both very stable and very long. With the assignment of such a high percentage of marks to stability, it may, of course, happen that some special tests may be required. It would be an extremely interesting test were it possible to launch the machines from a sufficient altitude, to launch them *upside down* (motor wound up) and see how they recovered themselves.

The fact that competitors from a distance or those who may be unable to personally attend the flying tests can appoint a deputy, is one which, we think, will be fully appreciated.

The special team prizes to be competed for by the affiliated clubs, and the fact that such clubs can exhibit at a greatly-reduced fee, should certainly help forward the affiliation scheme, which has already made so much progress.

Turning now more especially to the individual classes, it is most certainly to be hoped that there will be a first-class exhibit of power-driven models. The qualifying flying test of 30 secs. is one which should not bar either a CO_2 or a compressed air plant, more especially if the reservoir in the latter case be charged from a cylinder, and not from a foot pump.

In the last May numbers of the *Model Engineer*, Mr. H. H. Groves gave a full description with scale drawings of his pump-fed flash boiler power plant, and any competent model engineer should most certainly be perfectly capable of making it from the description there given. Mr. C. Desoutter has both a CO_2 and a compressed air plant on the market, and there are several other types of the last-named which can be obtained commercially.

And last, but by no means least, there is Mr. F. Mayer (Messrs. J. Bonn and Co.), whose petrol motor has not only done so well at bench tests, but has proved itself quite capable of flying anything "that even looks like an aeroplane." The last-named means, of course, a large model—but then we want to see some large models at Olympia. Aeromodellists have no longer the excuse that they would build an engined model if only they could get a power plant that would fly it; they can now procure such plants, and, as a result, we trust that there will be *at least* a dozen such models at Olympia next March.

If anyone thinks that the prizes of £10 and £5 make the "game hardly worth the candle"—we wish to point out that any competitor can also enter his model, or rather his motor (detached for the time being), *in* Class IV, and also his complete model in Class VI by paying the small additional entrance fees; the total prize money offered is really £26 instead of £15. The fact that power or engined models are eligible for the weight carrying competition raises a point to which we may as well refer while it occurs to us. At both the last Olympia Show and the *Model Engineer* flying tests at the Hendon Aerodrome, there was trouble with respect to the rising board provided—so far, that is, as this type of model was concerned. On the former occasion the board or boards were sadly deficient both in quality and quantity. On the latter the quality was A1, but the quantity was insufficient, Mr. Groves being unable to get his model to rise in the length of board provided, and the long, thick, tufty grass beyond precluded any such result. Now, a power-driven model carrying a dead load of one quarter its own weight will undoubtedly require a long run before rising, very possibly 20 or 30 yards at least, very likely more. Now what is going to be done to meet this very probable contingency no matter where the flying tests may be carried out? There is one obvious and easy solution, and that is to do away with a starting board, not only in Class I but in all the classes, and compel *every* model to rise from the ground, say *from cut and rolled grass*. Models, both engined and rubber-driven, have shown themselves capable of accomplishing this without any difficulty. One very good thing would result from such a rule, and that is so-called wheels about the size of a threepenny-bit or even less would have to go, and model aeroplaning would most decidedly gain in consequence.

We are very glad to see that this time there is to be in Class 2 a sub-section for single-propeller machines, as well as quite a separate class for tractors; both are matters which we have strongly advocated on more than one occasion. The single-propeller type opens a most interesting field for something really good in the way of Canard-type design; something which shall be, if possible, as good in its way as that of the famous monocoque tractor, with its beautiful streamline body. It is undoubtedly a matter of the greatest difficulty—but how great the achievement could it be accomplished. In the hydro-aeroplane class most, if not all, competitors will undoubtedly fit their models with wheels as well as floats. It must be understood that both wheels and floats *must* be carried throughout *all* the flying tests. The wheels can be made capable of being raised out of the water when starting from water, and lowered when starting from land, but nothing must be detachable. Great scope is open here for some very interesting work in both design and construction.

In Class IV it will be noticed the maximum weight limit has been reduced from 16 to 10 lbs. There is no minimum. So far as the ordinary aero modellist is concerned, a complete power plant of not more than a pound and a duration of about a minute would be the thing.

In Class X—ornithopter models—instead of a qualifying *distance*, which always lies open to criticism, a duration of 15 secs. has been substituted. The models are or may be hand launched.

The prize of £10 should certainly be sufficient to encourage experimentalists in this direction, and this time we fully believe the prize will be won.

On the whole we think the scheme deserves unqualified success, and we trust the total number of entries will be greater even than last year.

Glider Proofing, &c.

Mr. S. Camm (hon. sec. Windsor Aero Club) writes us as follows:—

"In answer to your correspondent, 'Canard,' I should say that although linseed oil may be somewhat heavy, it has proved fairly satisfactory on unbleached calico. It, however, should be boiled linseed oil, as this dries much quicker.

"As you may know, we have done a fair amount of glider building, and the fabric has always been the difficulty, and we now know that it is false economy to buy cheap covering, as the consequent difficulties encountered in proofing more than counteract any

slight saving in cost. On our present machine we have used unbleached calico, and have proofed it, first with a coat of size and then varnish and petrol. Unfortunately, this has turned out hygroscopic, *i.e.*, is affected very much by changes in the atmosphere. Ours is very tight in damp weather and baggy in dry. I think, therefore, that linseed oil would be a better proofing than petrol and varnish.

"We are strongly of the opinion that 150 sq. ft. is not nearly enough surface. Estimating the weight of an average pilot at 150 lbs., the machine would be loaded 1 lb. per sq. ft., without the weight of the machine. An average glider of that surface would weigh 90 lbs., so that the ultimate loading per sq. ft. would be 1·6 lb. Our experience has gone to show that a lightly loaded machine is much more successful than a heavily loaded one. For example, it is quite apparent that the less surface there is the gliding speed will be much faster, and the landings, consequently, more dangerous. The ideal loading is from ¾ to 1 lb. per sq. ft. On our machine it is 1 lb. to the sq. ft. From some reports in FLIGHT, one gathers that it is a common mistake to build machines with insufficient surface, and for that reason the point cannot be emphasized too much.

"It seems a great pity that the various gliding enthusiasts spread about the country cannot be brought into closer touch, as this would lead to the exchange of ideas, and all would benefit. As you may know, it is our intention, given sufficient backing, to build an engine-driven machine, and should this materialise the whole model club movement would invite considerably more respect."—[We are much obliged to Mr. Camm for his interesting letter, and for the valuable information contained therein, and we shall always be glad to hear further from him or from others who have experimented with full-sized gliders. We do not know, however, that we quite agree with our correspondent's final remarks—so long as the power is human muscle well and good, but an engine-driven glider scarcely, we think, comes within the scope of model work, nor can we see that it affects its status in any way.—V.E.J.]

KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

British Model Records.

Twin screw, hand-launched	Distance	R. Lucas	...	590 yards.
	Duration	A. F. Houlberg	...	129 secs.
Single screw, do.	Duration	H. Bedford	...	49 secs.
Twin screw, rise off ground	Distance	L. H. Slatter	...	365 yards.
	Duration	J. E. Louch	...	2 mins. 49 secs.
Single-tractor screw, hand-launched	Distance	C. C. Dutton	...	266 yards.
	Duration	J. E. Louch	...	68 secs.
Do., off-ground	Distance	C. C. Dutton	...	190 yards.
	Duration	J. E. Louch	...	45 secs.
Single screw hydro., off-water	Duration	L. H. Slatter	...	35 secs.
Single-tractor, do., do.	Duration	C. C. Dutton	...	29 secs.
Twin screw, do., do.	Duration	L. H. Slatter	...	60 secs.

Official Trials.—The next official trials will take place on the ground of the Paddington and Districts Aero Club at Sudbury, on Saturday, 22nd inst. It is hoped that a good number of would-be record holders will endeavour to break the records, and entries should be sent in at once.

Aero Show.—The sub-committee met at the Royal Aero Club, on Friday, 7th, and submitted their suggested programme, which consisted of eight classes, and it is hoped that it will be approved.

Affiliation.—All clubs should now send in their applications for affiliation, as special reduced terms for stands will only be made to affiliated clubs at the Show. Also only affiliated clubs will be able to compete for the team prizes which will be offered there, and for the Inter-club Challenge Shield given by Thos. Farrow, Esq. This contest will be run on lines similar to the English Football Cup. Full details will shortly be issued.

Correction.—In the results of the tractor competition, held on Saturday, Oct. 18th, the name of the fifth man was printed as having been Mr. J. Louch, whereas it should have read: 5th, Mr. E. Burton, of the Broadstairs Model Construction Co., with 45 marks, and Mr. Louch 6th with 40 marks.

Kite Competition.—Entries for the kite competition for the most practical use to which a kite can be put, to be held on Saturday, Nov. 29th, at Wimbledon, close on 22nd.

27, Victory Road, Wimbledon. W. H. AKEHURST, Hon. Sec.

AFFILIATED MODEL CLUBS DIARY.

CLUB reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Aero-Models Assoc. (N. Branch) (25, CHURCH CRESCENT, MUSWELL HILL, N.).

NOV. 15TH, monthly competition, speed r.o.g. 3 to 5 p.m.; 16th, practice, 10 a.m. and 3 p.m.; 20th, indoor meeting, 8 p.m.

Leytonstone and District Aero Club (64, LEYSPRING ROAD).

NOV. 16TH at 10 a.m., model flying, as usual, near Sand Hills, Wanstead Flats. If wet, meet at clubroom, Nov. 20th, at 8 p.m. Instruction at club-room, subject: Planes and Elevators.

Paddington and Districts (77, SWINDERBY ROAD, WEMBLEY).

NOV. 15TH, flying at Sudbury, r.o.g. and hand-launched competitions.

Wimbledon and District (165, HOLLAND ROAD, W.).

NOV, 15TH AND 16TH, flying as usual.

UNAFFILIATED CLUB.

S. Eastern Model Ae.C. (1, RAILWAY APPROACH, BROCKLEY).

NOV. 15TH, Woolwich Common, 3.30 p.m. till dusk; 16th, Blackheath, 7.30 to 10 a.m.

Mrs. Grahame-White Presents Prizes.

IT may be remembered that St. John's School, West Ealing, recently gained a Grahame-White exhibition, tenable at the G.-W. works at Hendon, and on Wednesday Mrs. Grahame-White visited the school and presented the prizes secured by pupils during the past year. In a short address Mr. Claude Grahame-White said that William Kerswell, the winner of the exhibition, was making satisfactory progress, and as a further inducement to the boys, he made them the offer of another scholarship.

80 h.p. *not* 120 h.p. De Dion.

FROM the Aircraft Co., Ltd., we learn that the De Dion engine fitted to the new Maurice Farman biplane is of 80 h.p. and not 120 h.p. as the De Dion Co. notified us. It seemed strange that more enhanced speeds were not attained had the motor been of the greater h.p., although, of course, it is difficult to judge entirely from this, as the elements have so much to say upon the subject.

IMPORTS AND EXPORTS, 1912-13.

AEROPLANES, airships, balloons, and parts thereof (not shown separately before 1910). For 1910 and 1911 figures, see FLIGHT, January 25th, 1912:—

	Imports.		Exports.		Re-Exportation.	
	1912.	1913.	1912.	1913.	1912.	1913.
	£	£	£	£	£	£
January	619	12,097	2,412	4,005	—	1,510
February	3,110	17,361	36	3,447	—	690
March ...	640	20,425	950	1,924	600	1,042
April ...	4,820	15,593	72	5,524	50	1,413
May ...	7,494	51,241	1,350	3,726	154	830
June ...	7,928	14,905	419	1,408	300	1,106
July ...	13,794	14,469	5,376	3,812	967	1,250
August ...	8,559	17,993	1,342	2,805	2,040	510
September	6,575	19,409	2,885	6,263	1,626	1,470
October	6,836	21,041	3,128	3,674	605	2,163
	60,375	204,534	17,970	36,588	6,432	11,984

NEW COMPANIES REGISTERED.

Bisford Synd., Ltd., 304, High Holborn, W.C.—Capital £5,000, in £1 shares. Acquiring certain patents for improvements in dirigible airships and flying machines. Under agreement with P. Bischoff, E. Bischoff, F. Forderer, and F. Jobbins. First directors, F. Jobbins, W. C. E. Hagreen, and J. Whieldon.

Nieuport (England), Ltd.—Capital £4,000, in £1 shares. Acquiring an option for inventions relating to aeroplanes, hydroplanes, airships, &c.

Aeronautical Patents Published.

Applied for in 1912.

Published November 13th, 1913.

23,744. N. A. THOMPSON. Running gear for flying machines.
24,232. T. DIETERLE. Wings for aeroplanes.
24,330. F. W. M. KARSTEN. Motorless flying machines.

Applied for in 1913.

Published November 13th, 1913.

4,191. F. WELLS. Flying machine.
8,586. JULIUS PINTSCHE AKT.-GES. Lighthouse, &c., lamps for aerial navigation.
9,356. GES FÜR NAUTISCHE INSTRUMENTE AND NEUFELDT AND KUNKE. Automatic controlling mechanism for hydro-aeroplanes, &c.
10,882. DONNET AND H. LEVEQUE. Aeroplanes.
11,675. H. FABRE. Marine aeroplane.

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